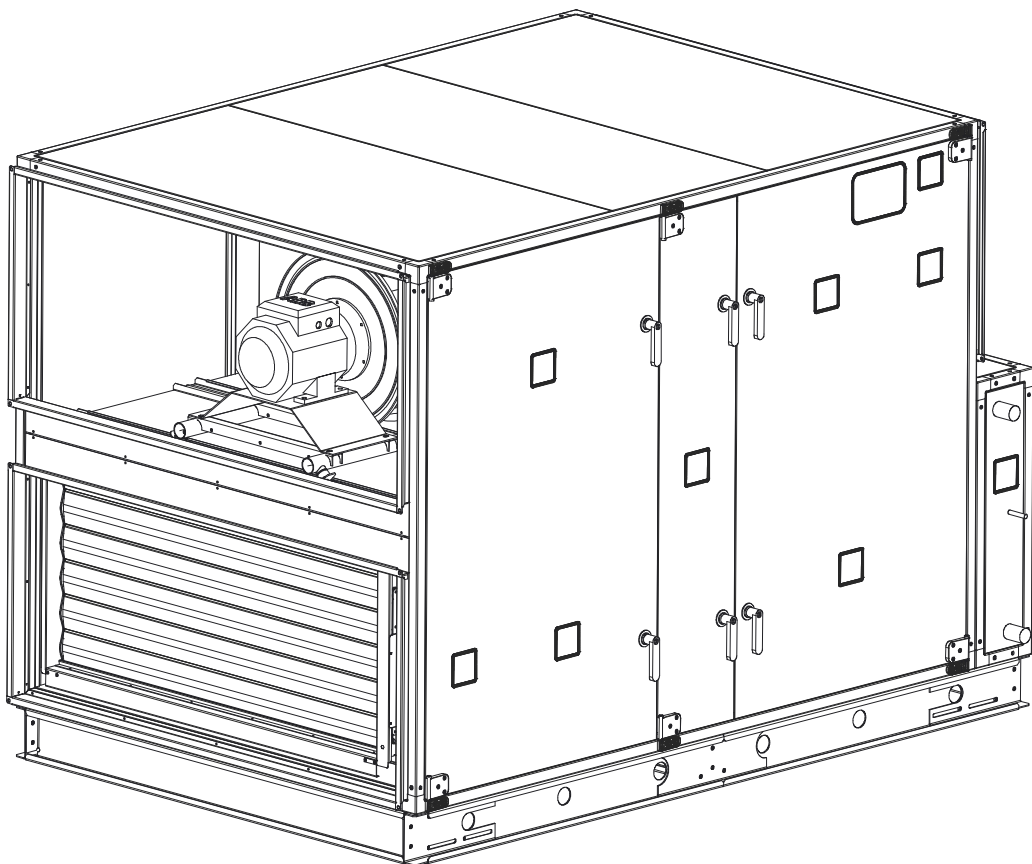


Annex 4–12 for the User Manual

Air handling units

Danvent DV - without control system



GB

Version 2.01.04

Master for translated versions of annex 4-12

Original version for this air handling unit

Overview

Annex 4 – 12 for the User Manual version 2.01.04 is printed in this separate manual

Annex 4 Assembly of base frame – height 150 mm for unit sizes 10 – 40
Annex 5 Assembly of base frame – height 150 mm for unit sizes 50 – 150
Annex 6 Assembly of base frame – height 250 mm for unit sizes 10 – 40
Annex 7 Assembly of base frame – height 250 mm for unit sizes 50 – 150
Annex 8 Installation of steel roof in the sizes 10-150
Annex 9 Rotary exchanger – speed control and assembly of divided rotor
Annex 10 Internal controller in the cooling compressor units – DVU and DVU-C
Annex 11 Menu for internal controller in the cooling compressor units - DVU and DVU-C
Annex 12 Connection of fan motor and set-up manual for Danfoss frequency converter

Annex 1 – 3 for the User Manual printed on separate pages delivered with the unit

Annex 1 Declaration of incorporation with production number
Annex 2 Technical data – unique data for every unit
Annex 3 Spare part lists

Annex 13 for the User Manual printed on separate pages delivered with the unit

Annex 13 Commissioning protocol - proposal
A DVD is delivered with every unit. On this DVD is a Word-file of the commissioning protocol – proposal for modification by the installer.

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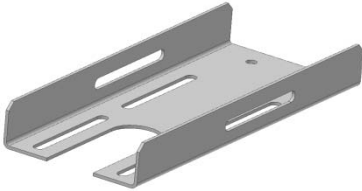
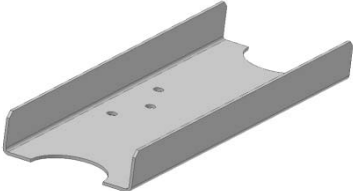
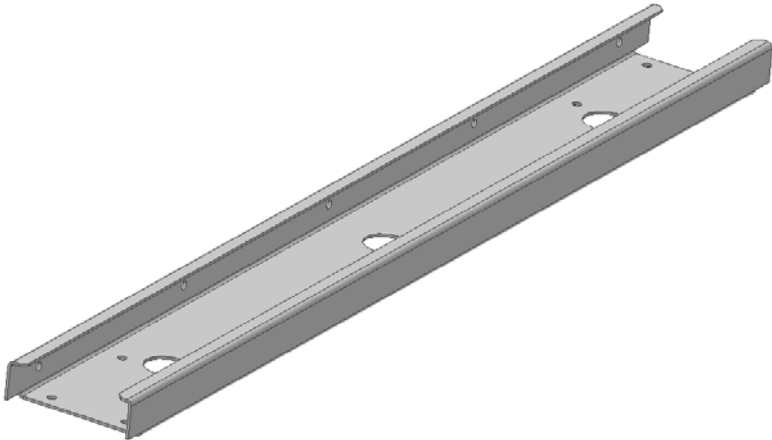
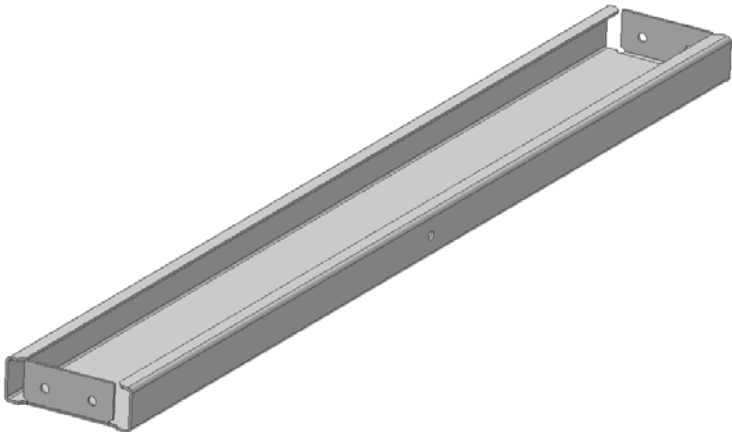
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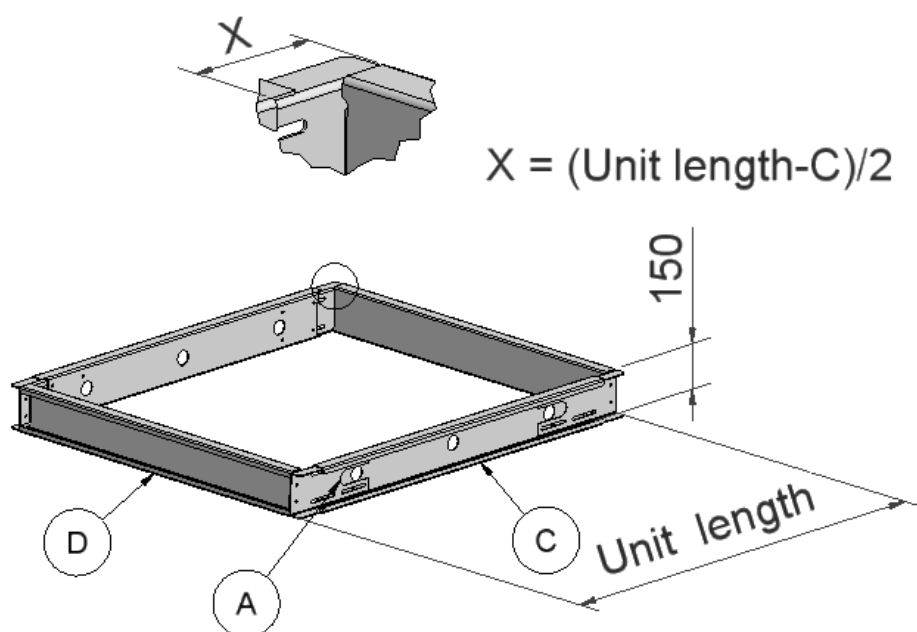
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Annex 4. Assemble base frames – height 150 mm for units sizes 10-40

A = Corner 	B = Splice 
C = Length profile 	
D = Width profile 	

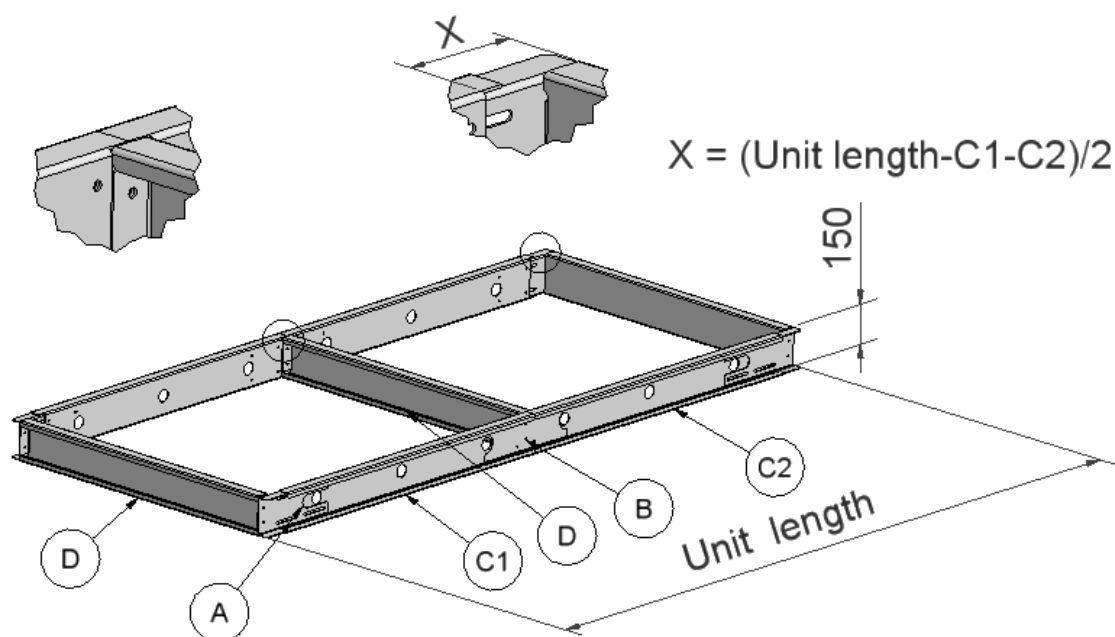
4.1 Base frame length 720 – 2420 [mm] Unit size 10-40



Width profile type D		
Unit size	Quantity	Length [mm]
DV-10	2	876
DV-15	2	1026
DV-20	2	1176
DV-25	2	1326
DV-30	2	1476
DV-40	2	1626

C		A	
Frame length [mm]	Quantity	Length [mm]	Quantity
700-770	2	520	4
770-920	2	670	4
920-1070	2	820	4
1070-1220	2	970	4
1220-1370	2	1120	4
1370-1520	2	1270	4
1520-1670	2	1420	4
1670-1820	2	1570	4
1820-1970	2	1720	4
1970-2120	2	1870	4
2120-2270	2	2020	4
2270-2420	2	2170	4

4.2 Base frame length 2420 – 4590 [mm] Unit size 10-40

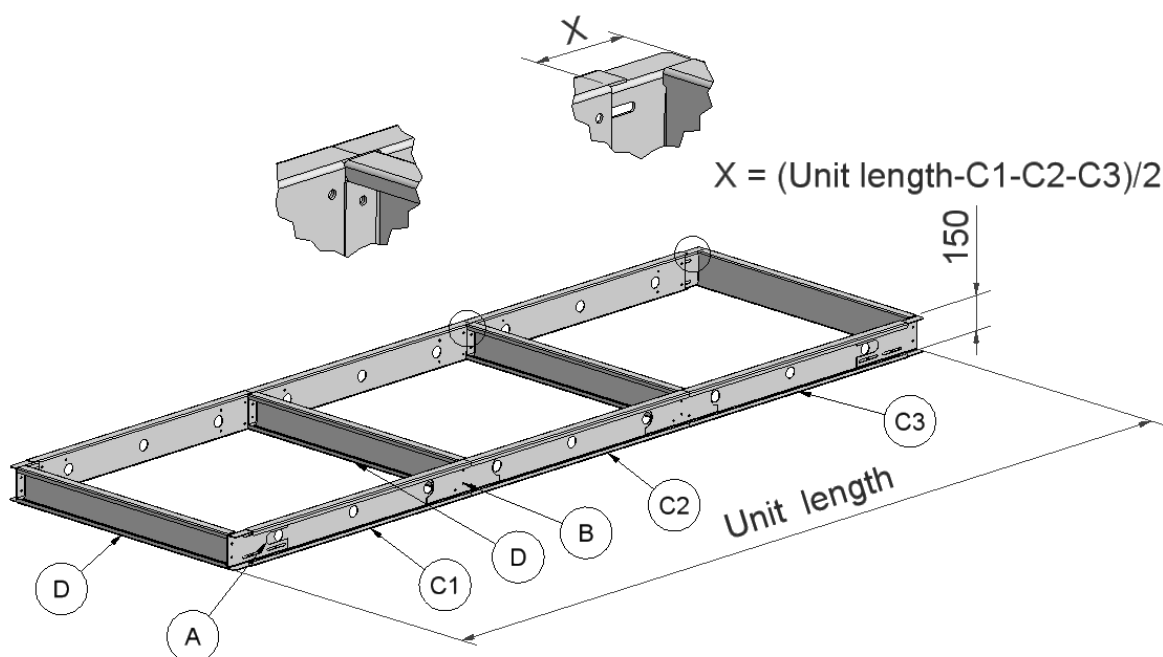


Width profile type D

<i>Unit size</i>	<i>Quantity</i>	<i>Length [mm]</i>
DV-10	3	876
DV-15	3	1026
DV-20	3	1176
DV-25	3	1326
DV-30	3	1476
DV-40	3	1626

		C1		C2		A	B
<i>Frame length [mm]</i>	<i>Quantity</i>	<i>Length [mm]</i>	<i>Quantity</i>	<i>Length [mm]</i>	<i>Quantity</i>	<i>Quantity</i>	
2420-2570	2	1120	2	1200	4	2	
2570-2640	2	1270	2	1200	4	2	
2640-2790	2	1270	2	1270	4	2	
2790-2940	2	1270	2	1420	4	2	
2940-3090	2	1420	2	1420	4	2	
3090-3240	2	1420	2	1570	4	2	
3240-3390	2	1570	2	1570	4	2	
3390-3540	2	1570	2	1720	4	2	
3540-3690	2	1720	2	1720	4	2	
3690-3840	2	1720	2	1870	4	2	
3840-3990	2	1870	2	1870	4	2	
3990-4140	2	1870	2	2020	4	2	
4140-4290	2	2020	2	2020	4	2	
4290-4440	2	2020	2	2170	4	2	
4440-4590	2	2170	2	2170	4	2	

4.3 Base frame length 4590 – 6200 [mm] Unit size 10-40

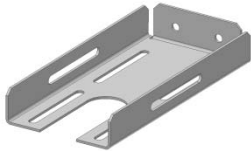
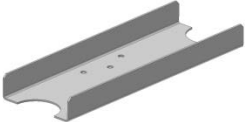
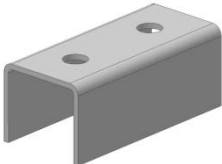
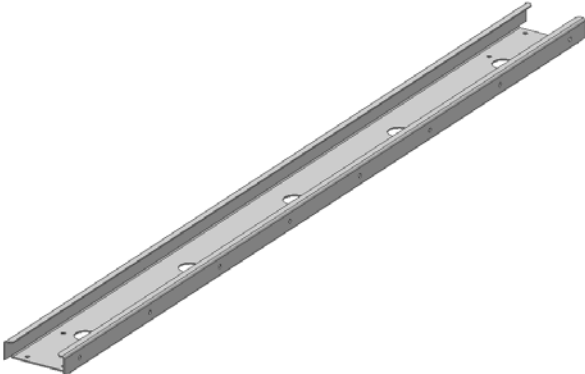
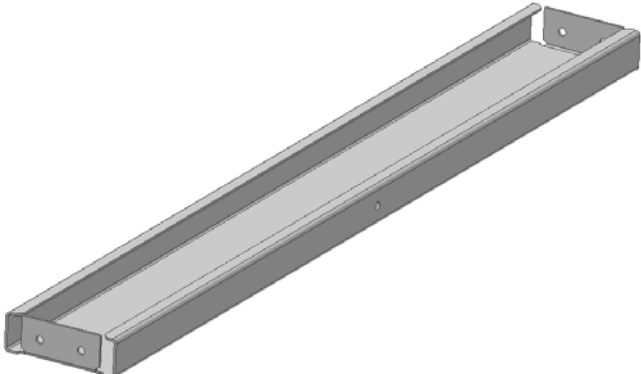
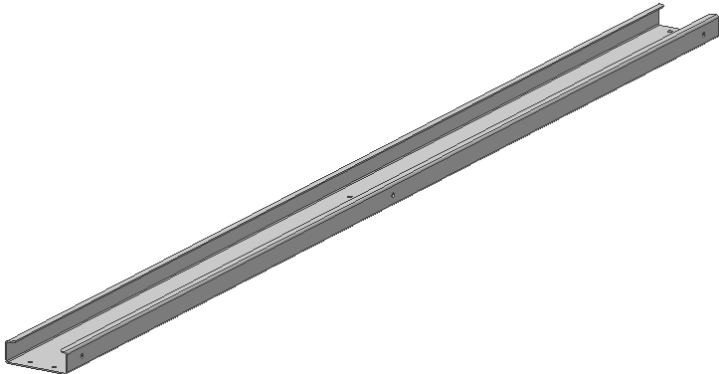


Width profile type D

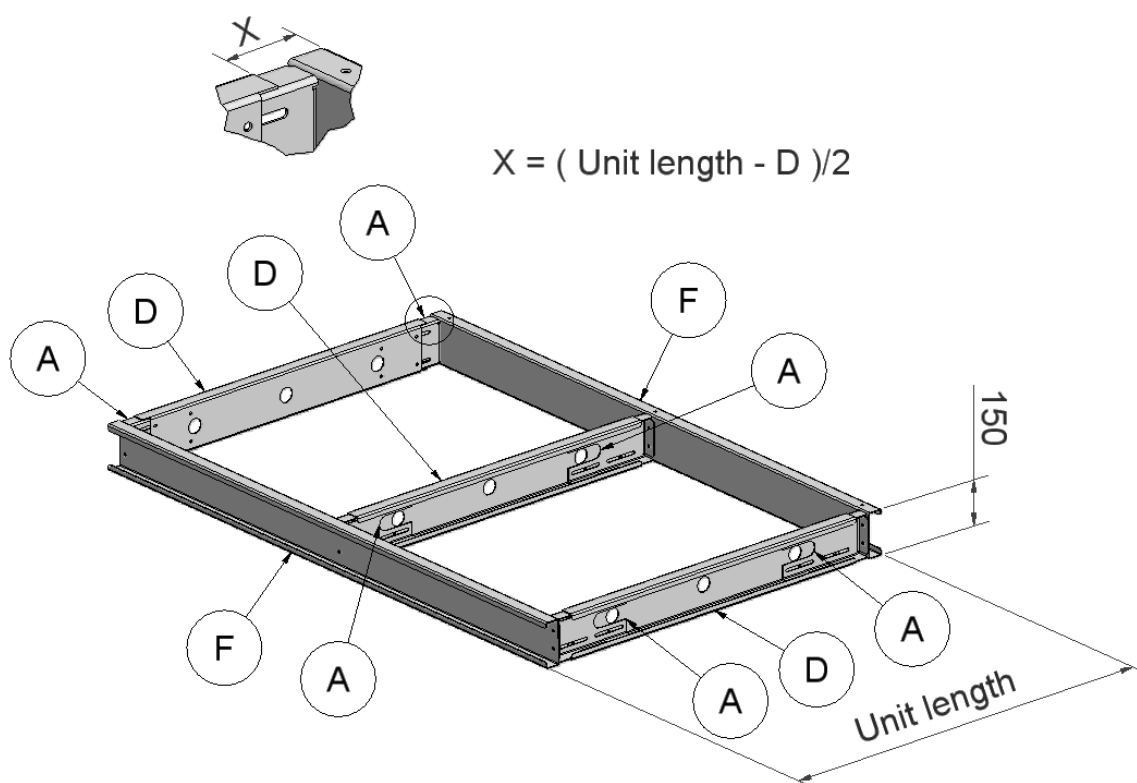
Unit size	Quantity	Length [mm]
DV-10	4	876
DV-15	4	1026
DV-20	4	1176
DV-25	4	1326
DV-30	4	1476
DV-40	4	1626

C1			C2		C3		A	B
Frame length [mm]	Quantity	Length [mm]	Quantity	Length [mm]	Number	Length [mm]	Qty	Qty
4590-4740	2	1420	2	1500	2	1570	4	4
4740-4890	2	1570	2	1570	2	1500	4	4
4890-5040	2	1720	2	1500	2	1570	4	4
5040-5110	2	1720	2	1720	2	1500	4	4
5110-5260	2	1720	2	1720	2	1570	4	4
5260-5410	2	1720	2	1720	2	1720	4	4
5410-5560	2	1870	2	1720	2	1720	4	4
5560-5710	2	1870	2	1870	2	1720	4	4
5710-5860	2	1870	2	1870	2	1870	4	4
5860-6010	2	2020	2	1870	2	1870	4	4
6010-6160	2	2020	2	2020	2	1870	4	4
6160-6200	2	2020	2	2020	2	2020	4	4

Annex 5. Assemble base frames – height 150 mm for units sizes 50-150

A = Corner 	B = Splice 	C = Spacer 
D = Length profile 		
E = Spacer profile 		
F = Width profile 		

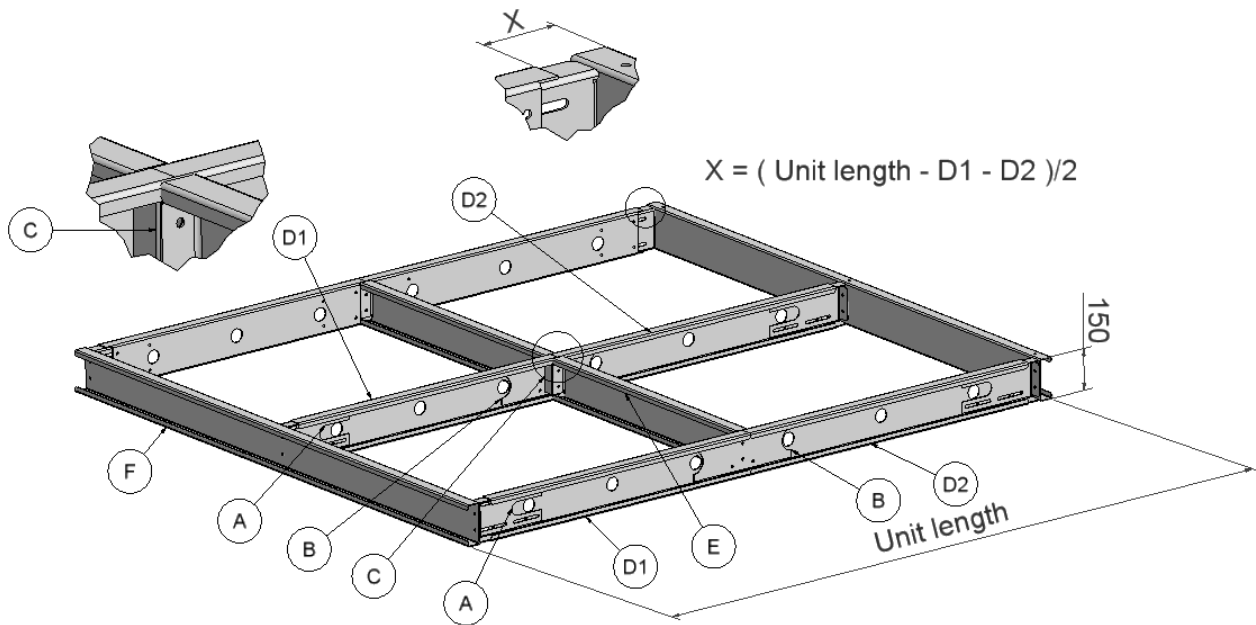
5.1 Base frame length 720 – 2420 [mm] Unit size 50-DV150



Width profile type F		
Unit size	Quantity	Length [mm]
DV-50	2	2020
DV-60	2	2170
DV-80	2	2170
DV-100	2	2370
DV-120	2	2590
DV-150	2	2890

Frame length [mm]	Quantity	D	A
		Length [mm]	Quantity
700-770	3	520	6
770-920	3	670	6
920-1070	3	820	6
1070-1220	3	970	6
1220-1370	3	1120	6
1370-1520	3	1270	6
1520-1670	3	1420	6
1670-1820	3	1570	6
1820-1970	3	1720	6
1970-2120	3	1870	6
2120-2270	3	2020	6
2270-2420	3	2170	6

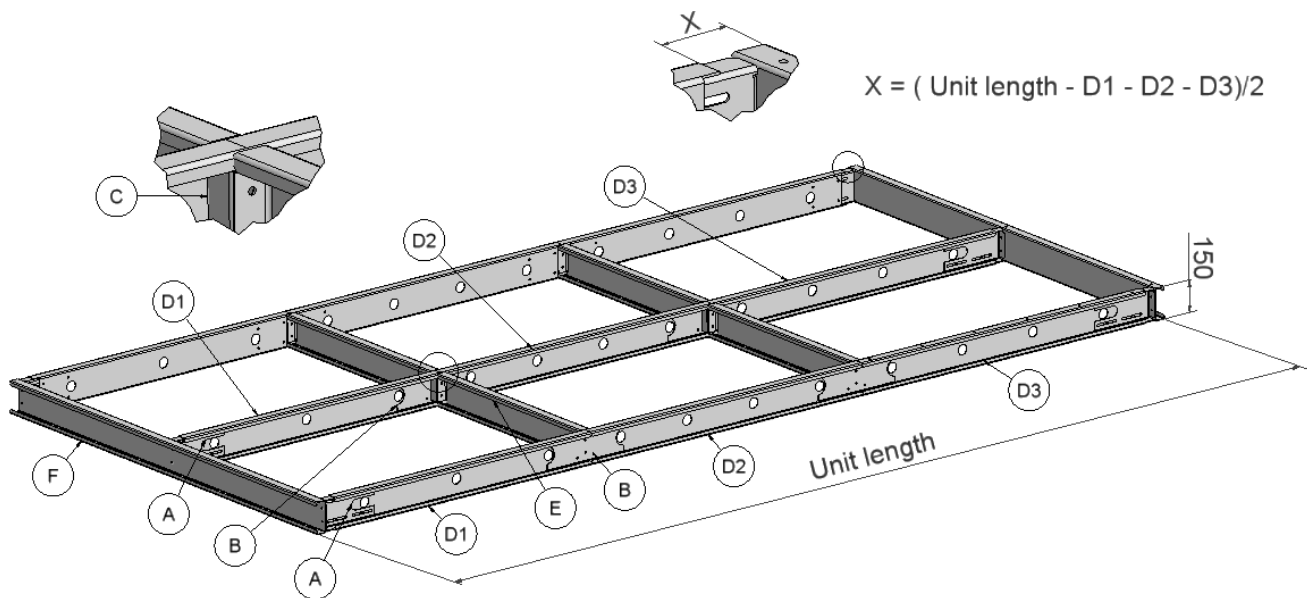
5.2 Base frame length 2420 - 4590 [mm] Unit size 50-150



Width profile type F			Width profile type E
Unit size	Quantity	Length [mm]	Length [mm]
DV-50	2	2020	940
DV-60	2	2170	1015
DV-80	2	2170	1015
DV-100	2	2370	1115
DV-120	2	2590	1225
DV-150	2	2890	1375

D1			D2		A	B	C	E
Frame length [mm]	Quantity	Length [mm]	Quantity	Length [mm]	Quantity	Quantity	Quantity	Quantity
2420-2570	3	1120	3	1200	6	3	1	2
2570-2640	3	1270	3	1200	6	3	1	2
2640-2790	3	1270	3	1270	6	3	1	2
2790-2940	3	1270	3	1420	6	3	1	2
2940-3090	3	1420	3	1420	6	3	1	2
3090-3240	3	1420	3	1570	6	3	1	2
3240-3390	3	1570	3	1570	6	3	1	2
3390-3540	3	1570	3	1720	6	3	1	2
3540-3690	3	1720	3	1720	6	3	1	2
3690-3840	3	1720	3	1870	6	3	1	2
3840-3990	3	1870	3	1870	6	3	1	2
3990-4140	3	1870	3	2020	6	3	1	2
4140-4290	3	2020	3	2020	6	3	1	2
4290-4440	3	2020	3	2170	6	3	1	2
4440-4590	3	2170	3	2170	6	3	1	2

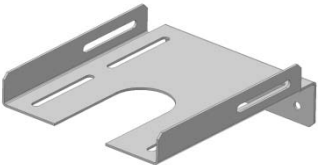
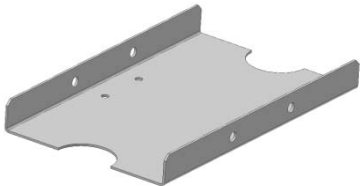
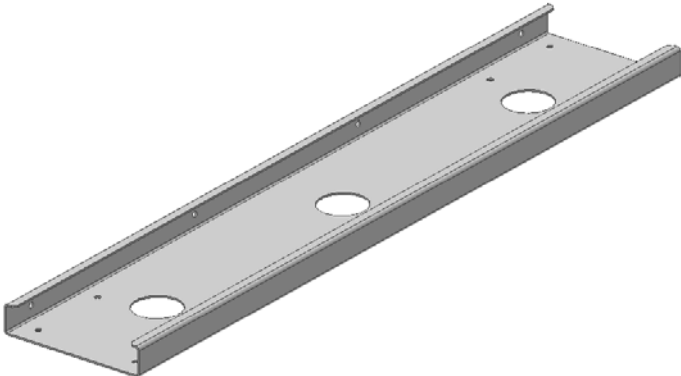
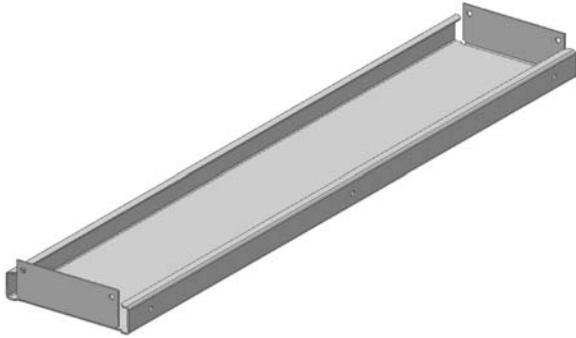
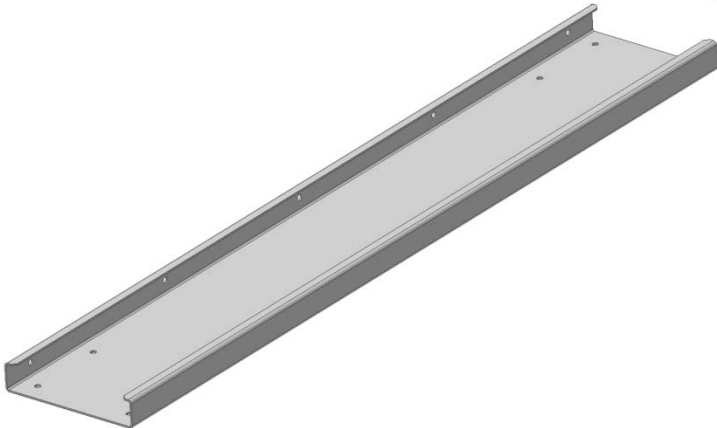
5.3 Base frame length 4590 – 6200 [mm] Unit size 50-150



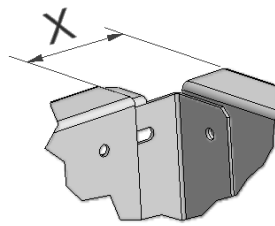
Width profile type F			Width profile type E
Unit size	Quantity	Length [mm]	Length [mm]
DV-50	2	2020	940
DV-60	2	2170	1015
DV-80	2	2170	1015
DV-100	2	2370	1115
DV-120	2	2590	1225
DV-150	2	2890	1375

Frame length [mm]	D1		D2		D3		A	B	C	E
	Qty	Length [mm]	Qty	Length [mm]	Qty	Length [mm]	Qty	Qty/	Qty	Qty
4590-4740	3	1420	3	1500	3	1570	6	6	2	4
4740-4890	3	1570	3	1570	3	1500	6	6	2	4
4890-5040	3	1720	3	1500	3	1570	6	6	2	4
5040-5110	3	1720	3	1720	3	1500	6	6	2	4
5110-5260	3	1720	3	1720	3	1570	6	6	2	4
5260-5410	3	1720	3	1720	3	1720	6	6	2	4
5410-5560	3	1870	3	1720	3	1720	6	6	2	4
5560-5710	3	1870	3	1870	3	1720	6	6	2	4
5710-5860	3	1870	3	1870	3	1870	6	6	2	4
5860-6010	3	2020	3	1870	3	1870	6	6	2	4
6010-6160	3	2020	3	2020	3	1870	6	6	2	4
6160-6200	3	2020	3	2020	3	2020	6	6	2	4

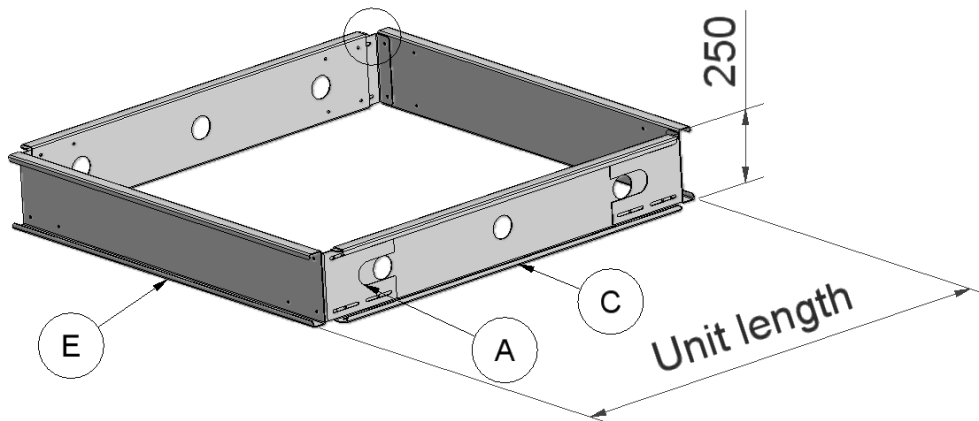
Annex 6. Assemble base frames – height 250 mm for units sizes 10-40

A = Corner 	B = Splice 
C = Length profile 	
D = Spacer profile 	
E = Width profile 	

6.1 Base frame length 720 – 2420 [mm] Unit size 10-40



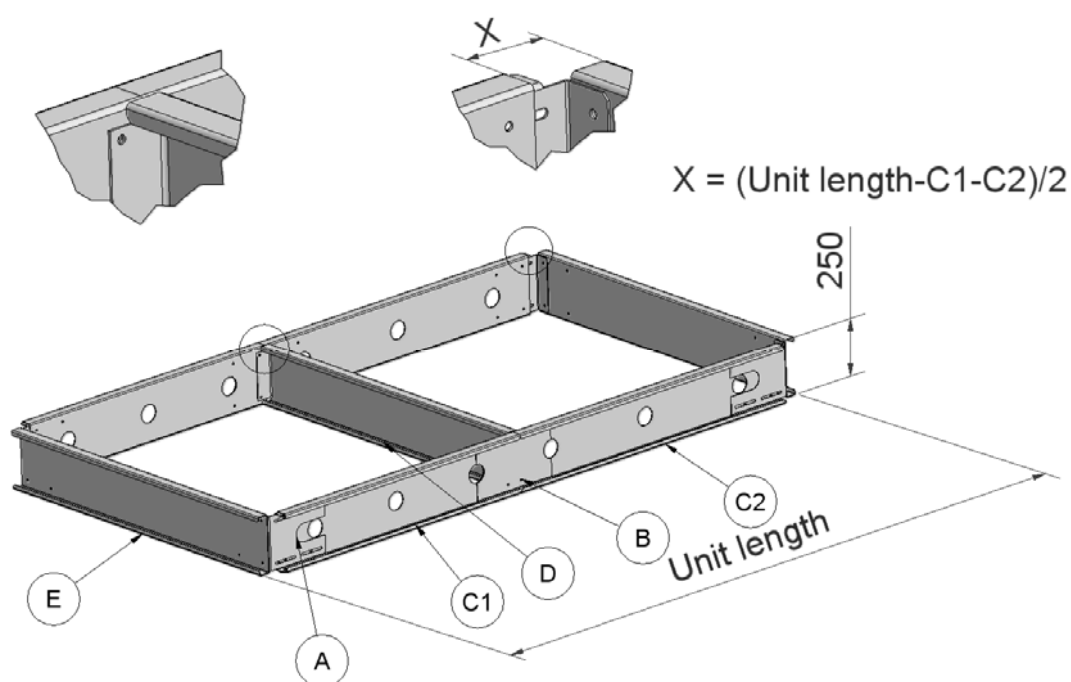
$$X = (\text{Unit length} - C) / 2$$



Width profile type E		
Unit size	Quantity	Length [mm]
DV-10	2	870
DV-15	2	1020
DV-20	2	1170
DV-25	2	1320
DV-30	2	1470
DV-40	2	1620

		C	A
Frame length [mm]	Quantity	Length [mm]	Quantity
700-770	2	520	4
770-920	2	670	4
920-1070	2	820	4
1070-1220	2	970	4
1220-1370	2	1120	4
1370-1520	2	1270	4
1520-1670	2	1420	4
1670-1820	2	1570	4
1820-1970	2	1720	4
1970-2120	2	1870	4
2120-2270	2	2020	4
2270-2420	2	2170	4

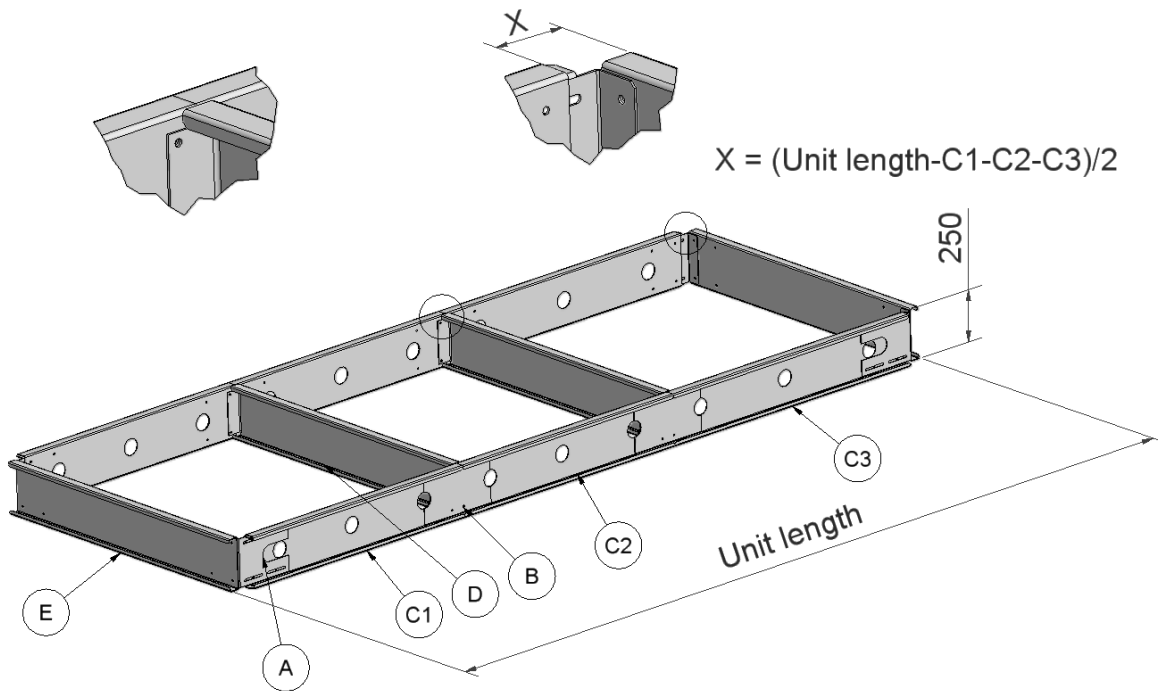
6.2 Base frame length 2420 – 4590 [mm] Unit size 10-40



Width profile type E			Spacer profile type D
Unit size	Quantity	Length [mm]	Length [mm]
DV-10	2	870	870
DV-15	2	1020	1020
DV-20	2	1170	1170
DV-25	2	1320	1320
DV-30	2	1470	1470
DV-40	2	1620	1620

		C1		C2		A	B	D
Frame length [mm]	Quantity	Length [mm]	Quantity	Length [mm]	Qty	Qty	Qty	
2420-2570	2	1120	2	1200	4	2	1	
2570-2640	2	1270	2	1200	4	2	1	
2640-2790	2	1270	2	1270	4	2	1	
2790-2940	2	1270	2	1420	4	2	1	
2940-3090	2	1420	2	1420	4	2	1	
3090-3240	2	1420	2	1570	4	2	1	
3240-3390	2	1570	2	1570	4	2	1	
3390-3540	2	1570	2	1720	4	2	1	
3540-3690	2	1720	2	1720	4	2	1	
3690-3840	2	1720	2	1870	4	2	1	
3840-3990	2	1870	2	1870	4	2	1	
3990-4140	2	1870	2	2020	4	2	1	
4140-4290	2	2020	2	2020	4	2	1	
4290-4440	2	2020	2	2170	4	2	1	
4440-4590	2	2170	2	2170	4	2	1	

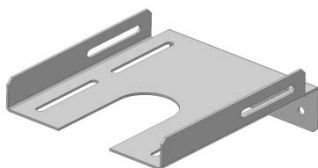
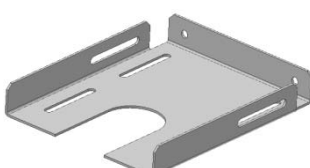
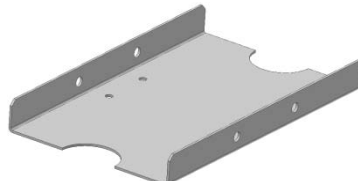
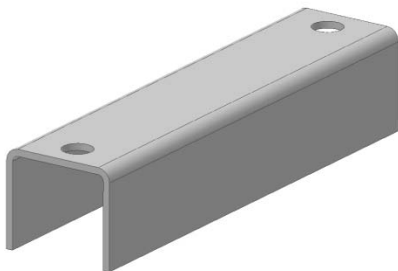
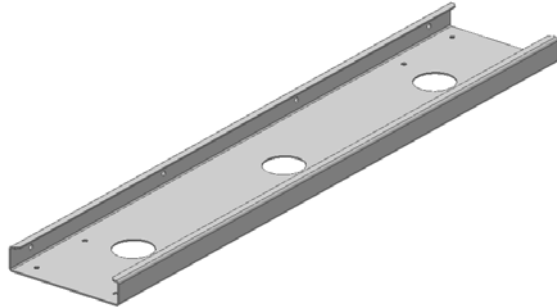
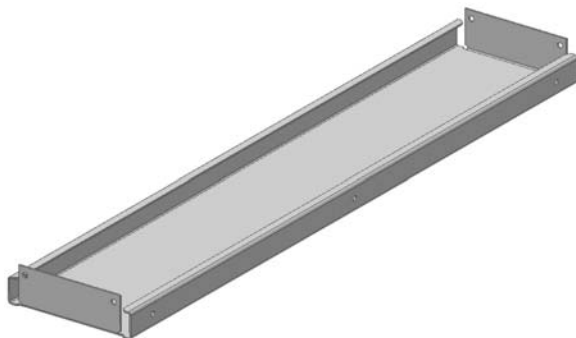
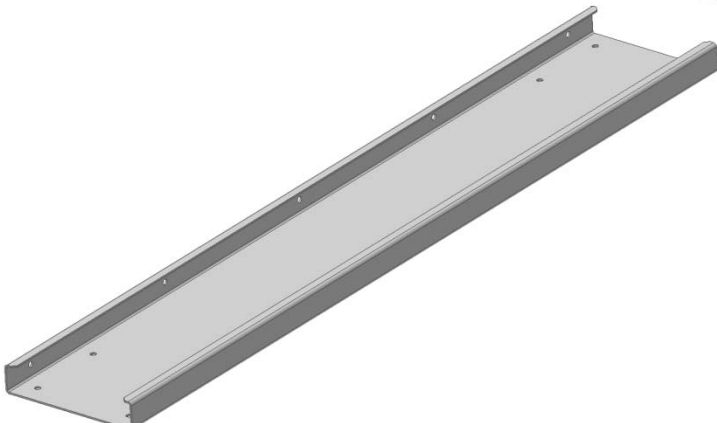
6.3 Base frame length 4590 – 6200 [mm] Unit size 10-40



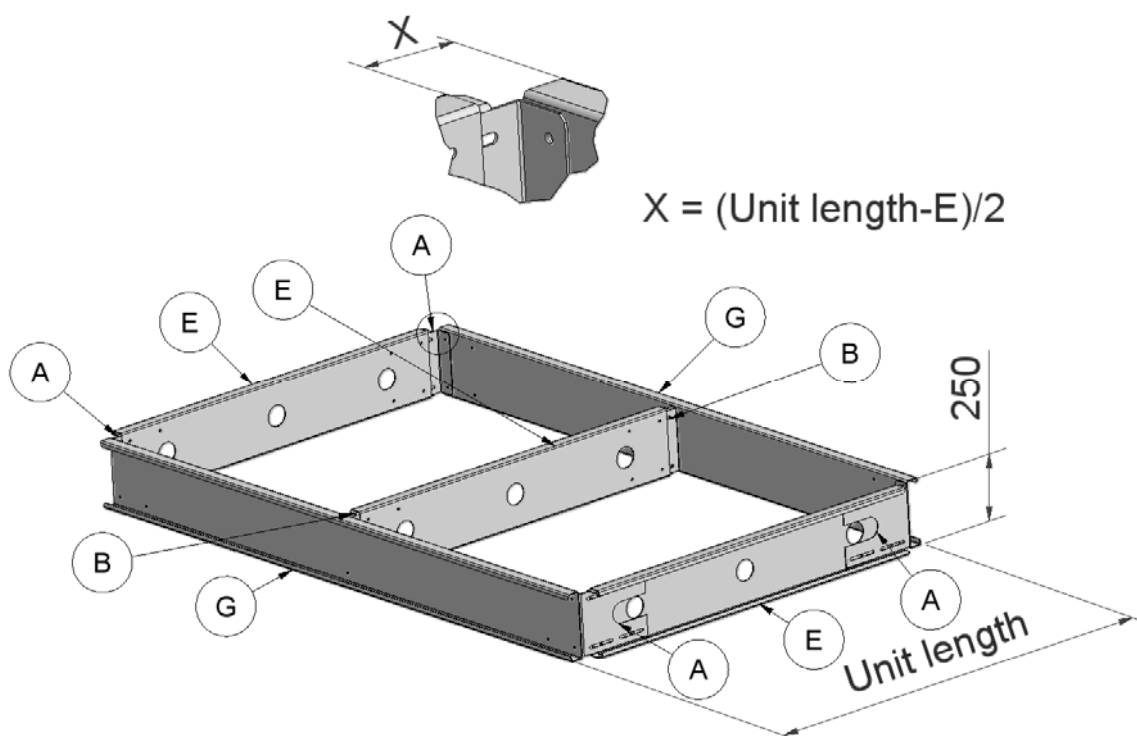
Width profile type E			Spacer profile type D
Unit size	Quantity	Length [mm]	Length [mm]
DV-10	2	870	870
DV-15	2	1020	1020
DV-20	2	1170	1170
DV-25	2	1320	1320
DV-30	2	1470	1470
DV-40	2	1620	1620

C1		C2		C3		A	B	D	
Frame length [mm]	Qty	Length [mm]	Qty	Length [mm]	Qty	Length [mm]	Qty	Qty	Qty
4590-4740	2	1420	2	1500	2	1570	4	4	2
4740-4890	2	1570	2	1570	2	1500	4	4	2
4890-5040	2	1720	2	1500	2	1570	4	4	2
5040-5110	2	1720	2	1720	2	1500	4	4	2
5110-5260	2	1720	2	1720	2	1570	4	4	2
5260-5410	2	1720	2	1720	2	1720	4	4	2
5410-5560	2	1870	2	1720	2	1720	4	4	2
5560-5710	2	1870	2	1870	2	1720	4	4	2
5710-5860	2	1870	2	1870	2	1870	4	4	2
5860-6010	2	2020	2	1870	2	1870	4	4	2
6010-6160	2	2020	2	2020	2	1870	4	4	2
6160-6200	2	2020	2	2020	2	2020	4	4	2

Annex 7. Assemble base frames – height 250 mm for units sizes 50-150

A = Corner	B = Splice	C = Splice
		
D = Spacer		E = Length profile
		
F = Spacer profile		
		
G = Width profile		
		

7.1 Base frame length 720 – 2420 [mm] Unit size 50-150

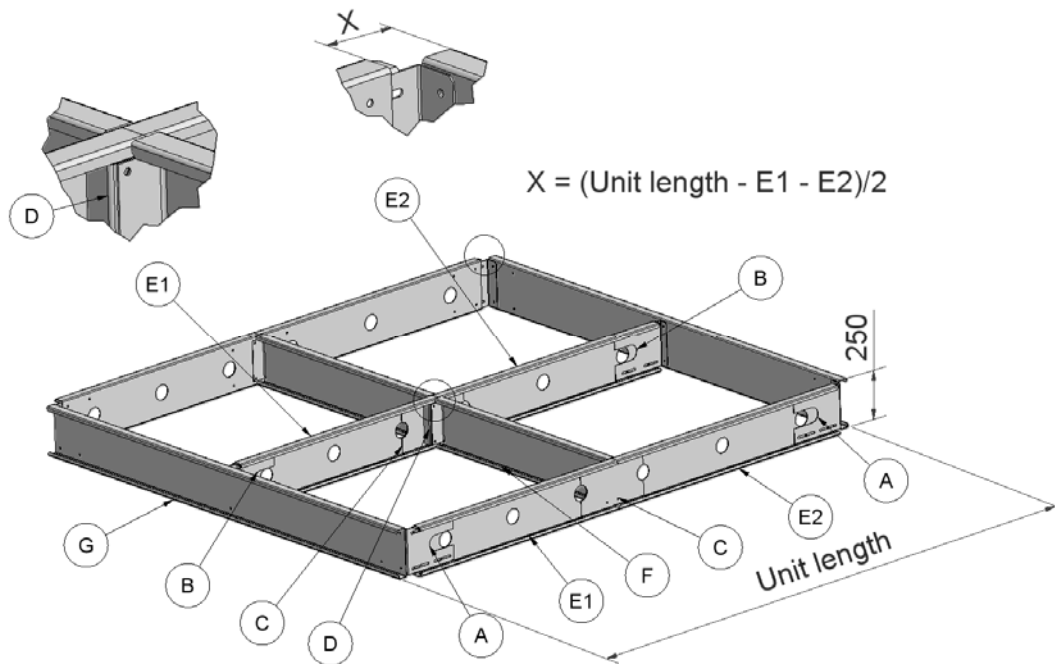


Width profile type G

Unit size	Quantity	Length [mm]
DV-50	2	1920
DV-60	2	2070
DV-80	2	2070
DV-100	2	2270
DV-120	2	2490
DV-150	2	2790

Frame length [mm]	Quantity	E	A	B
		Length [mm]	Quantity	Quantity
700-770	3	520	4	2
770-920	3	670	4	2
920-1070	3	820	4	2
1070-1220	3	970	4	2
1220-1370	3	1120	4	2
1370-1520	3	1270	4	2
1520-1670	3	1420	4	2
1670-1820	3	1570	4	2
1820-1970	3	1720	4	2
1970-2120	3	1870	4	2
2120-2270	3	2020	4	2
2270-2420	3	2170	4	2

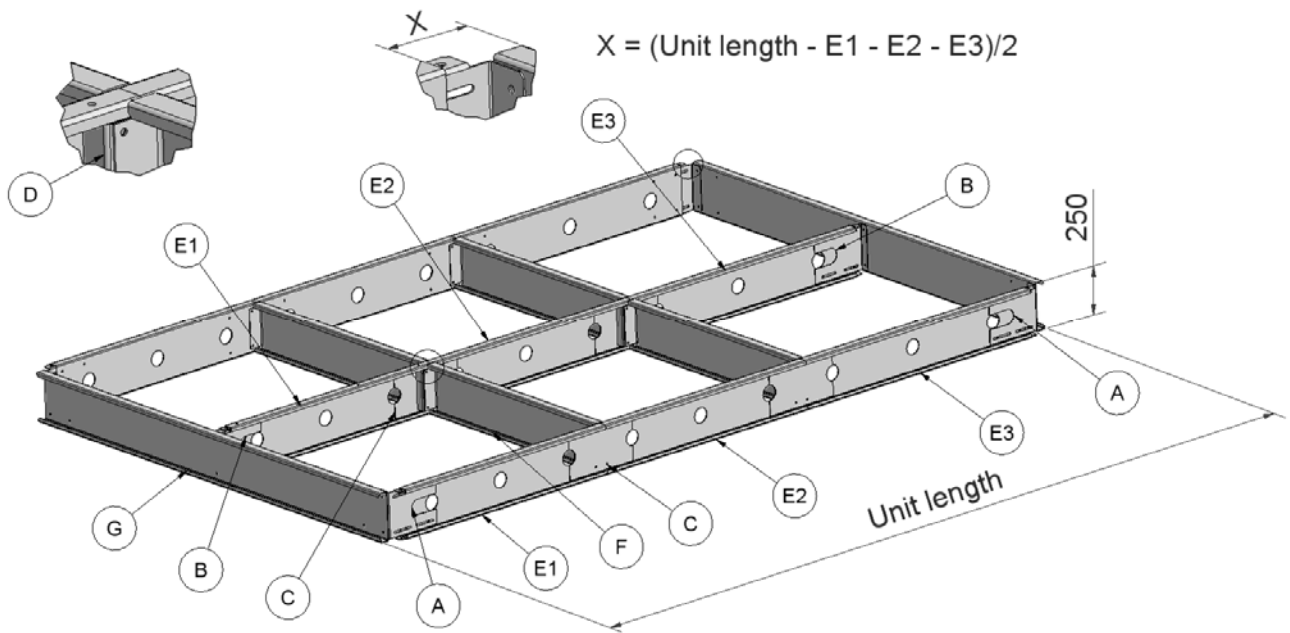
7.2 Base frame length 2420 – 4590 [mm] Unit size 50-150



Width profile type G			Spacer profile type F
Unit size	Quantity	Length [mm]	Length [mm]
DV-50	2	1920	935
DV-60	2	2070	1010
DV-80	2	2070	1010
DV-100	2	2270	1110
DV-120	2	2490	1220
DV-150	2	2790	1370

		C1		C2		A	B	C	D	F
Frame length [mm]	Qty	Length [mm]	Qty	Length [mm]	Qty	Qty	Qty	Qty	Qty	Qty
2420-2570	3	1120	3	1200	4	2	3	1	2	
2570-2640	3	1270	3	1200	4	2	3	1	2	
2640-2790	3	1270	3	1270	4	2	3	1	2	
2790-2940	3	1270	3	1420	4	2	3	1	2	
2940-3090	3	1420	3	1420	4	2	3	1	2	
3090-3240	3	1420	3	1570	4	2	3	1	2	
3240-3390	3	1570	3	1570	4	2	3	1	2	
3390-3540	3	1570	3	1720	4	2	3	1	2	
3540-3690	3	1720	3	1720	4	2	3	1	2	
3690-3840	3	1720	3	1870	4	2	3	1	2	
3840-3990	3	1870	3	1870	4	2	3	1	2	
3990-4140	3	1870	3	2020	4	2	3	1	2	
4140-4290	3	2020	3	2020	4	2	3	1	2	
4290-4440	3	2020	3	2170	4	2	3	1	2	
4440-4590	3	2170	3	2170	4	2	3	1	2	

7.3 Base frame length 4590 – 6200 [mm] Unit size 50-150



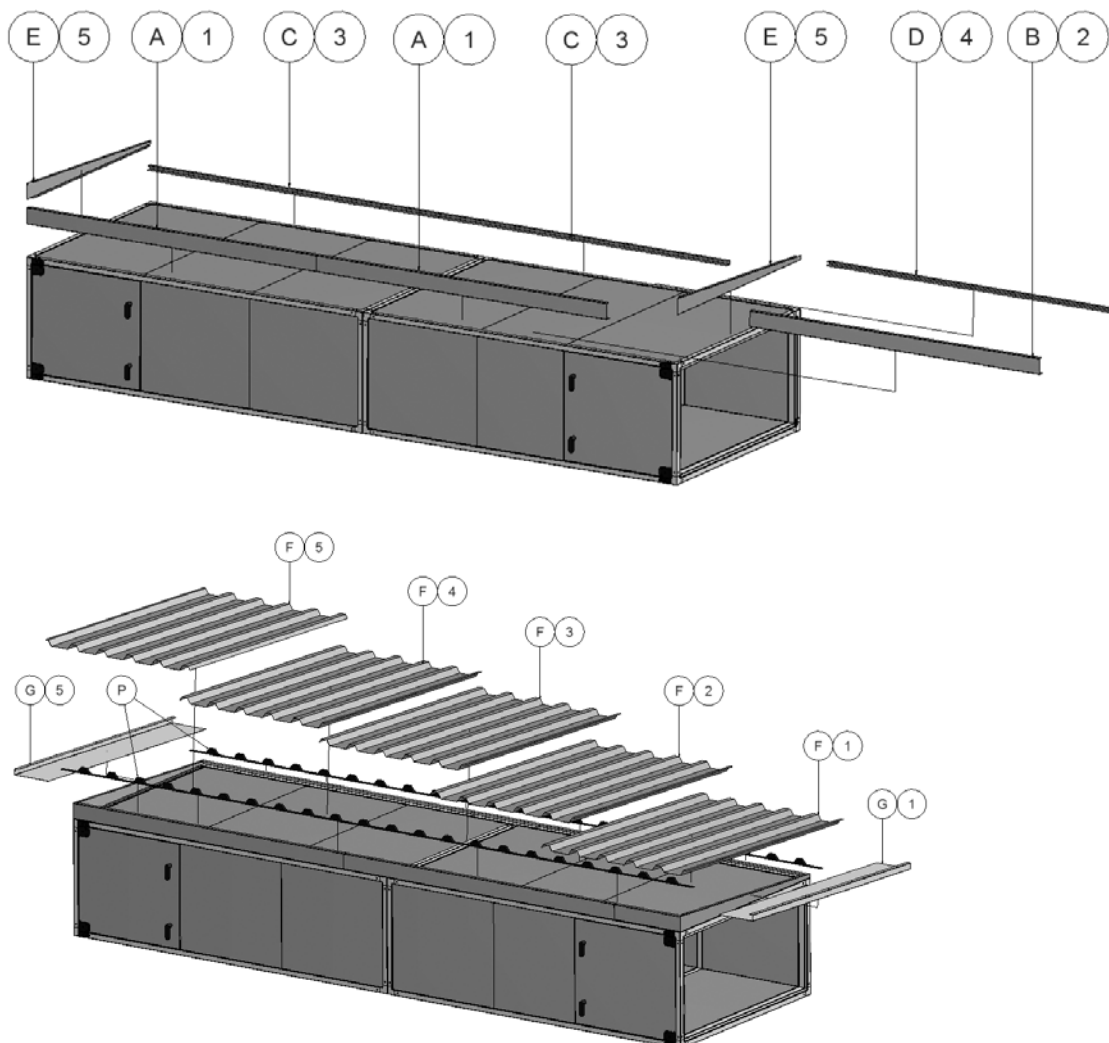
Width profile type G			Spacer profile type F	
Unit size	Quantity	Length [mm]	Length [mm]	
DV-50	2	1920	935	
DV-60	2	2070	1010	
DV-80	2	2070	1010	
DV-100	2	2270	1110	
DV-120	2	2490	1220	
DV-150	2	2790	1370	

Frame length [mm]	E1		E2		E3		A	B	C	D	F
	Qty	Length [mm]	Qty	Length [mm]	Qty	Length [mm]	Qty	Qty	Qty	Qty	Qty
4590-4740	3	1420	3	1500	3	1570	4	2	6	2	4
4740-4890	3	1570	3	1570	3	1500	4	2	6	2	4
4890-5040	3	1720	3	1500	3	1570	4	2	6	2	4
5040-5110	3	1720	3	1720	3	1500	4	2	6	2	4
5110-5260	3	1720	3	1720	3	1570	4	2	6	2	4
5260-5410	3	1720	3	1720	3	1720	4	2	6	2	4
5410-5560	3	1870	3	1720	3	1720	4	2	6	2	4
5560-5710	3	1870	3	1870	3	1720	4	2	6	2	4
5710-5860	3	1870	3	1870	3	1870	4	2	6	2	4
5860-6010	3	2020	3	1870	3	1870	4	2	6	2	4
6010-6160	3	2020	3	2020	3	1870	4	2	6	2	4
6160-6200	3	2020	3	2020	3	2020	4	2	6	2	4

Annex 8. Installation of steel roof in the sizes 10-150

8.1 Overview

- Mount rails A1, B2, C3, D4, E5 on the unit for support of trapezoidal roof plates (mount also rails Y and Z on units of the size 30 and on units that are larger than size 30 longitudinally at the centre-line of the units).
- Place foam bands – P – on the horizontal rails A1, B2, C3 and D4 for support of roof plates.
- Calculate overhang of the roof at both ends of the unit and mount roof overhang profile – G1 on the first trapezoidal roof plate – F1 before the roof plate is mounted.
- Place and mount roof plates F1, F2, F3 and so on.
- Remember foam bands on the side laps between roof plates to prevent rainwater from passing through.
- Place roof overhang profile – G5 at the other end of the unit before the last roof plate is mounted.
- Mount sides and corners on the roof.
- Apply sealing where plates are joined to ensure water resistance - even in stormy weather.



8.2 Mount rails. Units of size 10, 15, 20, and 25

Squeeze sealant in sufficient quantity between the underside of the rails A1, B2, C3, D4, E5 and the horizontal top side of the unit before the rails are mounted. This means that the rails are standing on sealant to achieve the tightest connection between rails and unit to prevent rainwater from passing under the rails and into the unit. Mount the rails A1 and B2 on the front side (the side with the inspection doors) – use the simple self-drilling screws without the sealing washer – see the illustration of the screw below.



Note: Rail B2 fits into the rail A1, and this offers the advantage that the rail B2 can be slid inside the rail A1 to adjust the length of rail B2 accurately to the length of the unit. In this way it is not necessary to spend time and effort cutting the rail B2.

Mount the lower rails C3 and D4 on the back side of the unit.

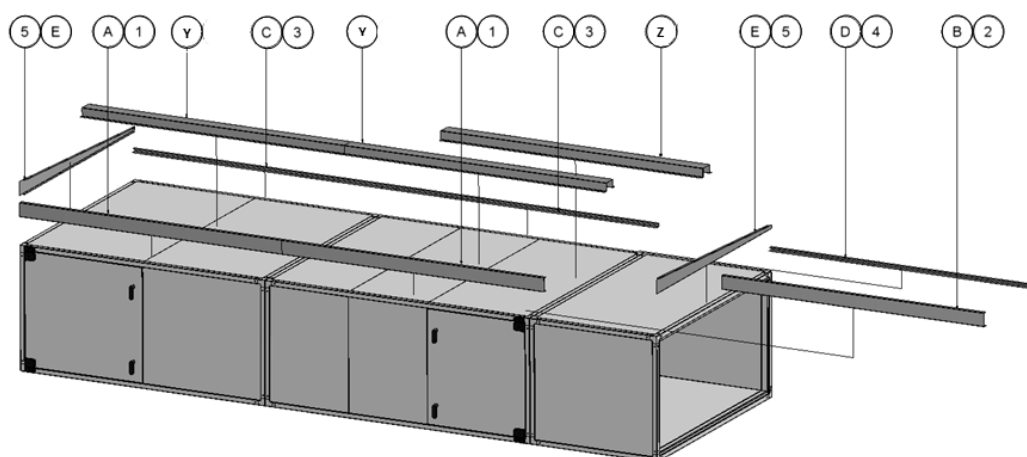
Note: Rail D4 fits into the rail C3, and this offers the advantage that the rail D4 can be slid inside the rail C3 to adjust the length of rail D4 accurately to the length of the unit. In this way it is not necessary to spend time and effort on cutting the rail D4.

Mount vertical rail – E5 - with the roof slope at each end of the unit

It is important to place a screw in each hole – even though the number of holes for screws seems to be very large, a screw in each hole is necessary as the stress on the roof during stormy weather is extremely high.

8.3 Mount rails. Units of size 30 and units larger than size 30.

On units of size 30 and on units that are larger than size 30, rails A1, B2, C3, D4, E5 must be mounted on the unit for support of trapezoidal roof plates, but also rails Y and Z must be mounted longitudinally at the centre-line of the units to hold the trapezoidal roof plates.



Squeeze sealant in sufficient quantity between the underside of the rails A1, B2, C3, D4, E5 and the horizontal top side of the unit before the rails are mounted. This means that the rails are standing on sealant to achieve the tightest connection between rails and unit to prevent rainwater from passing under

the rails and into the unit. Mount the rails A1 and B2 on the front side (the side with the inspection doors) – use the simple self drilling screws without the sealing washer – see the illustration of the screw below.



Note: Rail B2 fits into the rail A1, and this offers the advantage that the rail B2 can be slid inside the rail A1 to adjust the length of rail B2 accurately to the length of the unit. In this way it is not necessary to spend time and effort cutting the rail B2.

Mount the lower rails C3 and D4 on the back side of the unit.

Note: Rail D4 fits into the rail C3, and this offers the advantage that the rail D4 can be slid inside the rail C3 to adjust the length of rail D4 accurately to the length of the unit. In this way it is not necessary to spend time and effort cutting the rail D4.

Mount vertical rail – E5 - with the roof slope at each end of the unit.

Mount the rails Y and Z on the unit with the centre-line of the rails exactly over the centre-line of the unit. It is longitudinal on the middle of the units to hold the trapezoidal roof plates.

Notice, that rail Z fits over the lower rail Y, and this offers the advantage that the rail Z can be slid on the rail Y to adjust the length of rail Z accurately to the length of the unit. In this way it is not necessary to spend time and effort on cutting the rail Z.

It is important to place a screw in each hole – even though the number of holes for screws seems to be very large, a screw in each hole is necessary as the stress on the roof during stormy weather is extremely high.

8.4 Roof overhang along the long sides of the unit

The roof plates are longer than the width of the unit to ensure sufficient overhang along the sides of the unit.

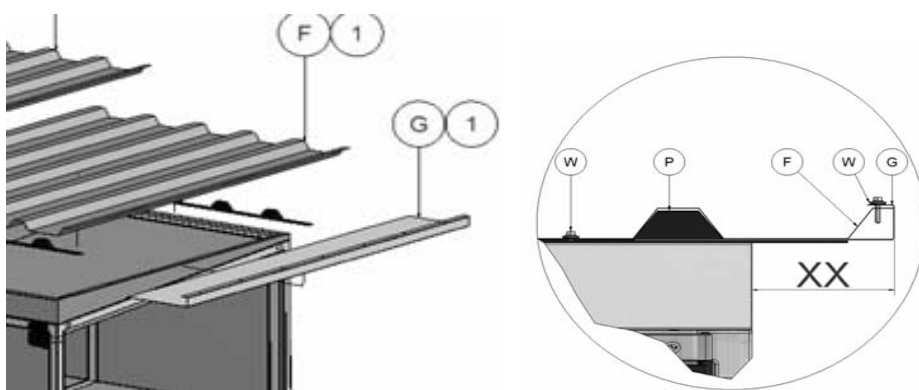
The overhang is 100 mm along each side of the smallest unit – size 10.

The overhang is 150 mm along each side of the units – size 15, 20, 25.

The overhang is 175 mm along each side of the biggest units – including size 30.

8.5 Calculation of the overhang at the ends of the unit. Mount overhang profile – G1.

The roof must be between 200 and 400 mm longer than the length of the unit to secure a roof overhang between 100 mm and 200 mm at the each of the 2 ends of the unit, and the length of this overhang must be calculated before the first roof plate is mounted.



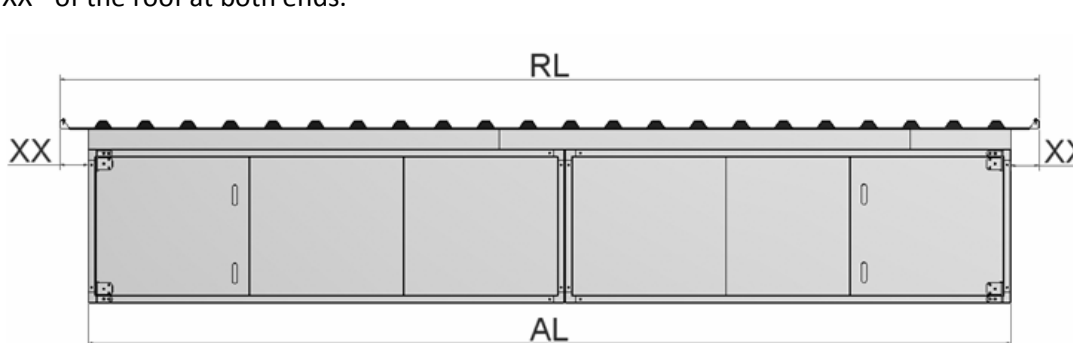
The unit is delivered with 2 similar overhang profiles - G1 and G5 - one for each end of the roof. Mount one of the 2 roof overhang profiles – G on a trapezoidal roof plate. Use the self drilling, painted screws with sealing washers - W - see the illustration.

Note: Foam bands - P – are necessary between the overhang profile G1 and the roof plate F1. See the illustration.



Self-drilling, painted screws supplied with sealing washer for the mounting of the trapezoidal plate to the roof overhang profile.

The total cover width of the trapezoidal roof plates always changes with the pitch of 207 mm between the trapezoidal ribs, making up a total length of the complete roof of - for example 2070 mm, 2277 mm, 2484 mm and so on. We call this length of the total roof for RL and we call the total length of the complete unit for AL. The trapezoidal roof must always be longer than the unit, to obtain a reasonable overhang called – XX - of the roof at both ends.



In the table below you will find 40 different lengths of roofs (always changing with the 207 mm) and the lengths of units that are ideal for each of the 40 alternative roof lengths.

Measure the total length – AL of the unit – for example 5 metres between the 4982 and 5182 mm mentioned in the table below.

AHU length AL	Roof length RL
1670 – 1870	2070
1877 – 2077	2277
2084 – 2284	2484
2291 – 2491	2691
2498 – 2698	2898
2705 – 2905	3105
2912 – 3112	3312
3119 – 3319	3519
3326 – 3526	3726
3533 – 3733	3933
3740 – 3940	4140
3947 – 4147	4347
4154 – 4354	4554
4361 – 4561	4761

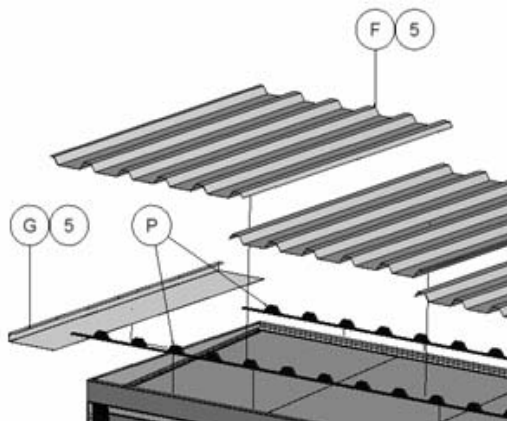
AHU length AL	Roof length RL
4568 – 4768	4968
4775 – 4975	5175
4982 – 5182	5382
5189 – 5389	5589
5396 – 5596	5796
5603 – 5803	6003
5810 – 6010	6210
6017 – 6217	6417
6224 – 6424	6624
6431 – 6631	6831
6638 – 6838	7038
6845 – 7045	7245
7052 – 7252	7452
7259 – 7459	7659

AHU length AL	Roof length RL
7466 – 7666	7866
7673 – 7873	8073
7880 – 8080	8280
8087 – 8287	8487
8294 – 8494	8694
8501 – 8701	8901
8708 – 8908	9108
8915 – 9115	9315
9122 – 9322	9522
9329 – 9529	9729
9536 – 9736	9936
9743 – 9943	10143

The mentioned length of roof – RL - for this length of unit is 5382 mm (the delivered trapezoidal plates can be combined to this length - RL = 5382 mm). 5382 mm minus 5000 mm is 382 mm overhang for both ends, and $382/2 \text{ mm} = 191 \text{ mm}$ is the overhang for each end. Place the trapezoidal roof plate F1 with the roof overhang profile G1 on rail E with an overhang of 191 mm.

8.6 Foam bands between rails and roof plates – mount roof plates.

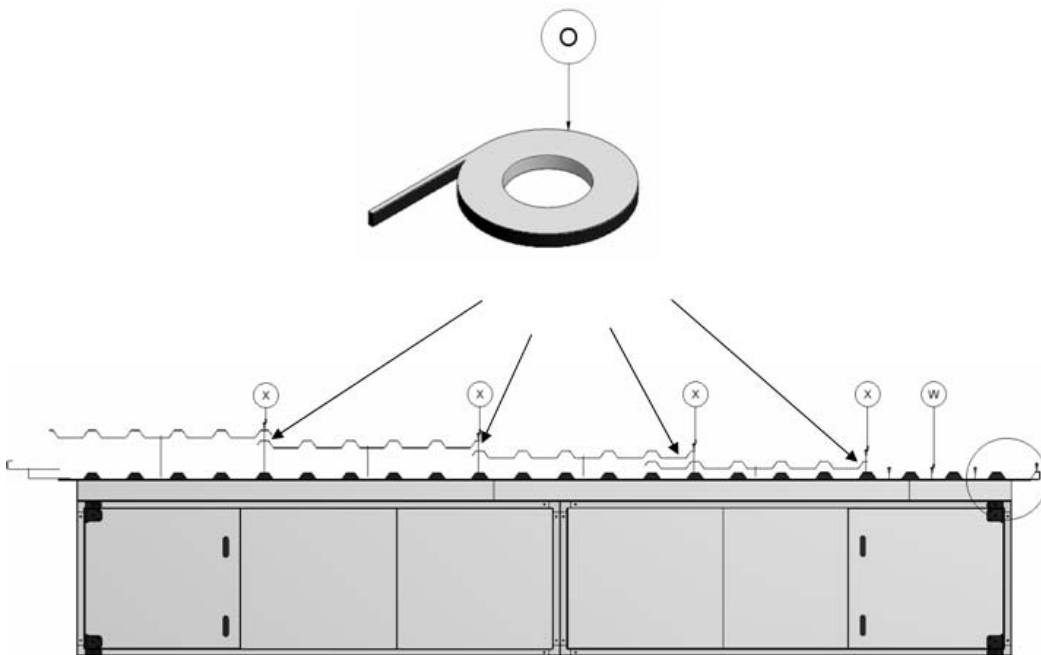
Place foam bands P between profiles A1, B2, C3, D4 and roof plates.



The trapezoidal roof plates are mounted with the self-drilling, painted screws supplied with sealing washer.

8.7 Foam bands between roof plates

Mount the self-adhesive foam band – O - on the underlapping rib for water resistant and effective sealing due to the small slope of the roof.

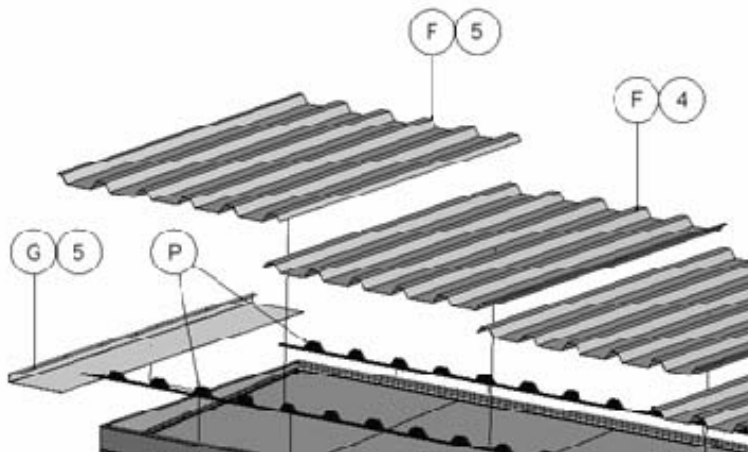


8.8 Mount roof plates – some of them are overlapping by 2 ribs

The width of each plate is always 1.035 mm and some of the plates have to overlap by 2 ribs to achieve the optimal total length of the whole roof — see the illustration above.

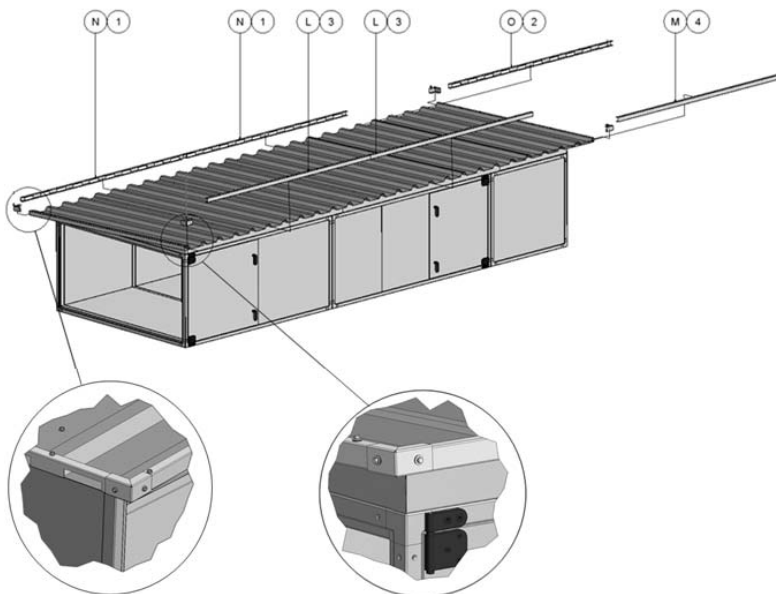
8.9 Mount overhang profile – G5 on the other end of the unit.

When the last trapezoidal plate (in this example F5) has been placed on the unit, the second roof overhang profile G5 must be pushed under the trapezoidal roof plate and mounted with the self-drilling, painted screw with sealing washer. Mounting must be similar to the mounting of roof overhang profile under the trapezoidal roof plate at the other end of the unit.



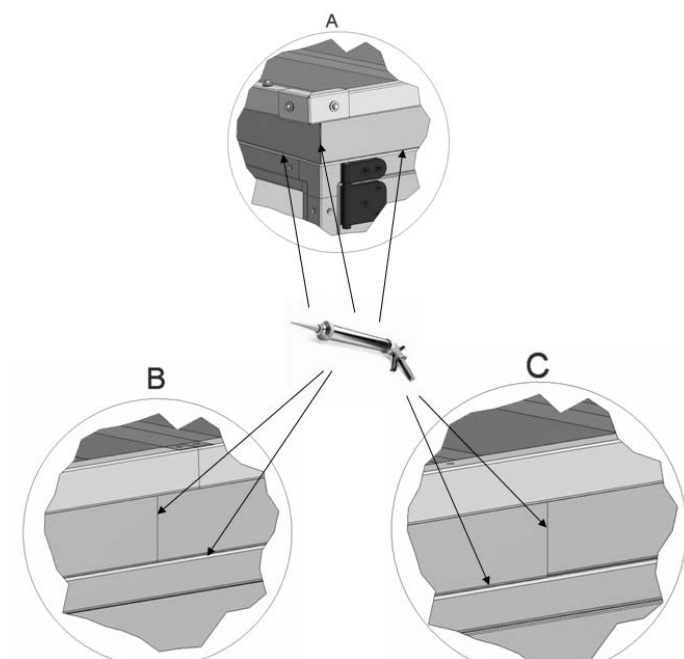
8.10 Mount side profiles and corners along the edges of the roof to protect persons

Profiles N and O with the rectangular holes are for the long and lower side of the roof because rain can escape through the holes. Mount the profiles type N first and the profile O last because the profile O goes over the profile N. Mounted in this order, the profile O can match the end of the roof and the surplus length of the profile O will just cover part of the previous profile N. Mount the profiles L and M along the long and higher front side of the roof. Mount the 4 protection corners.



8.11 Apply sealing on plate joints to ensure water resistance.

Finish installation of the steel roof by sealing all plate joints with silicone to prevent rainwater from passing into the unit. See examples below of joints to be sealed.



Annex 9. Speed control for rotor and assembly of divided rotor

9.1 Speed control

The cabinet with the speed control system for the rotor is installed behind the inspection door in the rotor section.

The cabinet contains the speed controller with all components, terminal blocks, LED displaying the operation mode, the dual position DIP switch with 4 sliding levers for programming the rotor motor signal and a button for the activation of the test mode.

Through the different combinations of the 4 sliding levers of this dual position DIP switch, the correct signal is available for the 3 different motors used for the 14 sizes of air handling units. The sliding levers are set and the function is checked at the factory. The positions of the levers appear from the tables below.

9.1.1 Selection of correct signal via the 4 DIP switch levers



The 4 DIP switch levers

Position	Function	Code
Up	Active = ON	1
Down	Deactivated = OFF	0

The factory sets the positions of the 4 DIP switch levers for the maximum of 10 revolutions per minute for standard temperature exchangers and for hygroscopic exchangers. The position of each DIP switch lever is shown below.

DV	Diameter of pulley	DIP switch position	Motor
10	50	0000	90TYD-S214-M 2.8Nm
15	50		
20	50		
25	65		
30	65		
40	65	1000	
50	71	0100	120TYD-S214-M 5.5Nm
60	80		
80	85		
100	95		
120	106		
150	112		
190	132	0010	120TYD-S214-L 7.5Nm
240	140		

The factory sets the positions of the 4 DIP switch levers for the maximum of 20 revolutions per minute for sorption exchangers. The position of each DIP switch lever is shown below.

DV	Diameter of pulley	DIP switch position	Motor
10	50	1000	90TYD-S214-M 2.8Nm
15	87	0100	120TYD-S214-M 5.5Nm
20	87		
25	107		
30	107		
40	107	1100	
50	118		
60	118		
80	140	1010	120TYD-S214-L 7.5Nm
100	150	0110	
120	150		
150	160		
190	160		
240	160		

9.1.2 Indication of operation mode via red and green LED as well as test of motor

The LED is in the cover of the cabinet.

LED indication	Value
No indication	Power off
Green	Ordinary operation
Green – flashes	Ready for operation
Constant green and red indication for activated rotor guard	Magnet on the rotor has activated rotor guard
Constant green and fast red flashes	Restart sequence active
Red	Rotor guard has not been activated

Number of red flashes in series	Value
1	Output current limit
2	Over voltage
3	Under voltage
4	Failure in the controller
5	Communication failure

Restart of rotor:

- Switch off power and switch on power again
or
- Press the test button inside the cabinet

Test of motor by checking the resistance in all 3 windings

Motor sizes	Ohm
90TYD-S214-M	40Ω
120TYD-S214-M	18Ω
120TYD-S214-L	10Ω

Setting of constant speed:

- Set fourth DIP switch lever in position - ON

Test:

- Set fourth DIP switch lever in position – ON
- Press the test button

9.1.3 Copy of the label with information about connection of cables

This self-adhesive label is always placed on the cover of the cabinet. The text is always in English.


Manuel
Setpoint

						Black	Blue	Brown			
9	10	11	12	13	14	15	16	17	18	19	
Relay COM	Relay NC	Relay NO	Uin 0-10VDC	GND	Rotary Guard	GND	VCC (max 10mA)	RS485 A	RS485 B	GND	

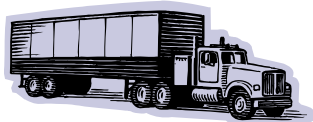
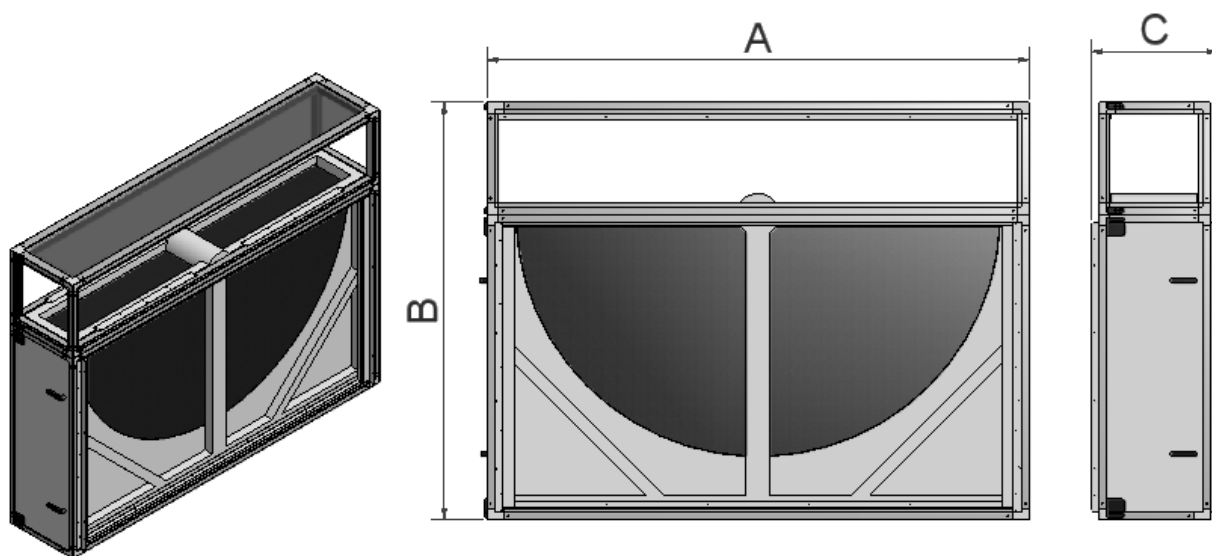

Test/Reset

*Disable Rotary guard
by connecting
14 and 16.*

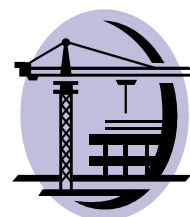
DIP SETTINGS:

DIP1	DIP2	DIP3	DIP4	FUNCTION
OFF	OFF	OFF	---	90 TYD-S214-M 250RPM
ON	OFF	OFF	---	90 TYD-S214-M 275RPM
OFF	ON	OFF	---	120 TYD-S214-M 250RPM
ON	ON	OFF	---	120 TYD-S214-M 300RPM
OFF	OFF	ON	---	120 TYD-S214-L 270RPM
ON	OFF	ON	---	120 TYD-S214-L 300RPM
OFF	ON	ON	---	120 TYD-S214-L 350RPM
---	---	---	OFF	AI 0-10V CONTROL
---	---	---	ON	POTENTIOMETER CONTROL

9.2 Assemble the Systemair casing for DV60, DV80, DV100, DV120 og DV150



Size	A	B	C
DV 60	2170	1640	520
DV 80	2320	1790	588
DV 100	2520	1940	588
DV 120	2890	2090	558
DV 150	3040	2240	558



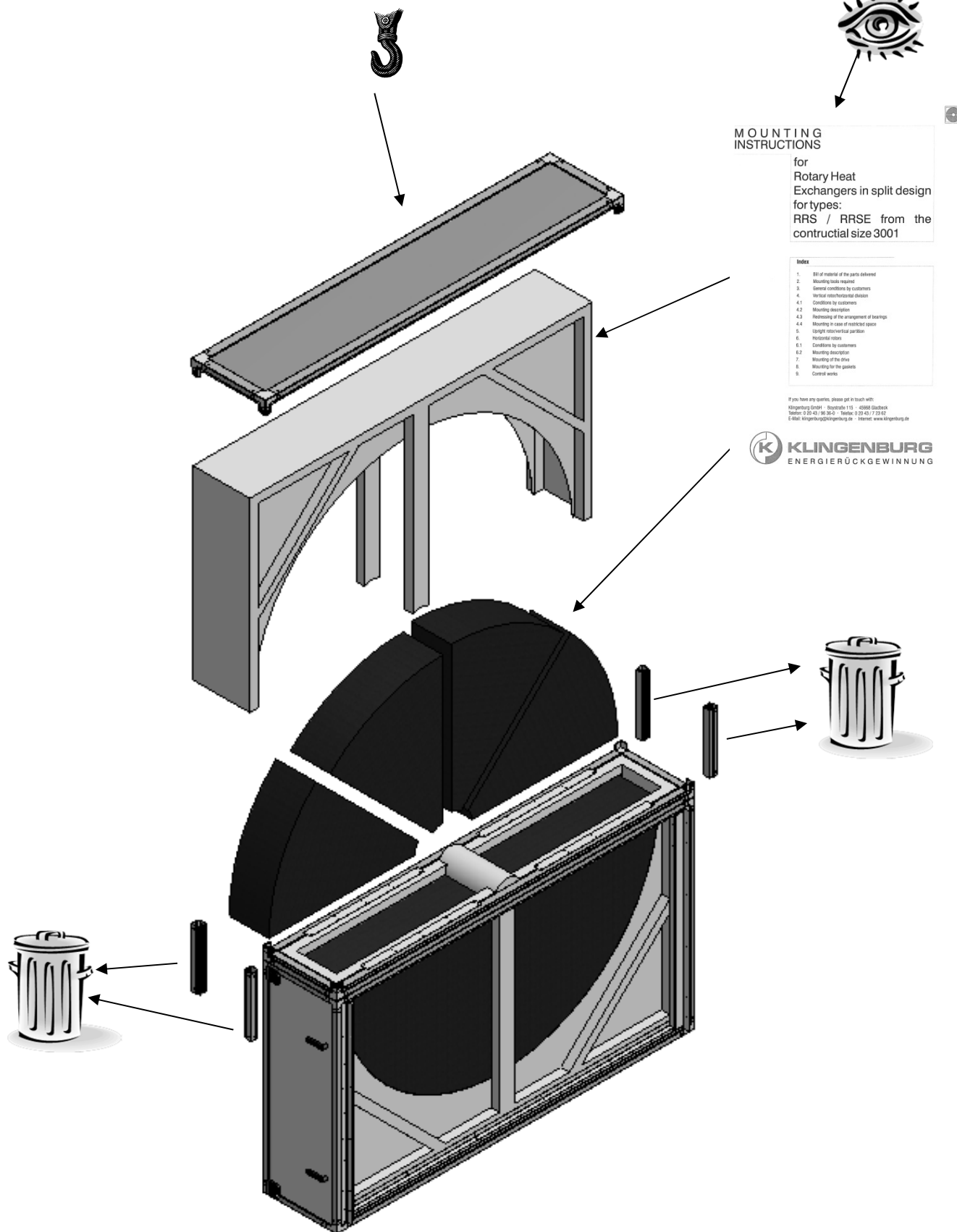


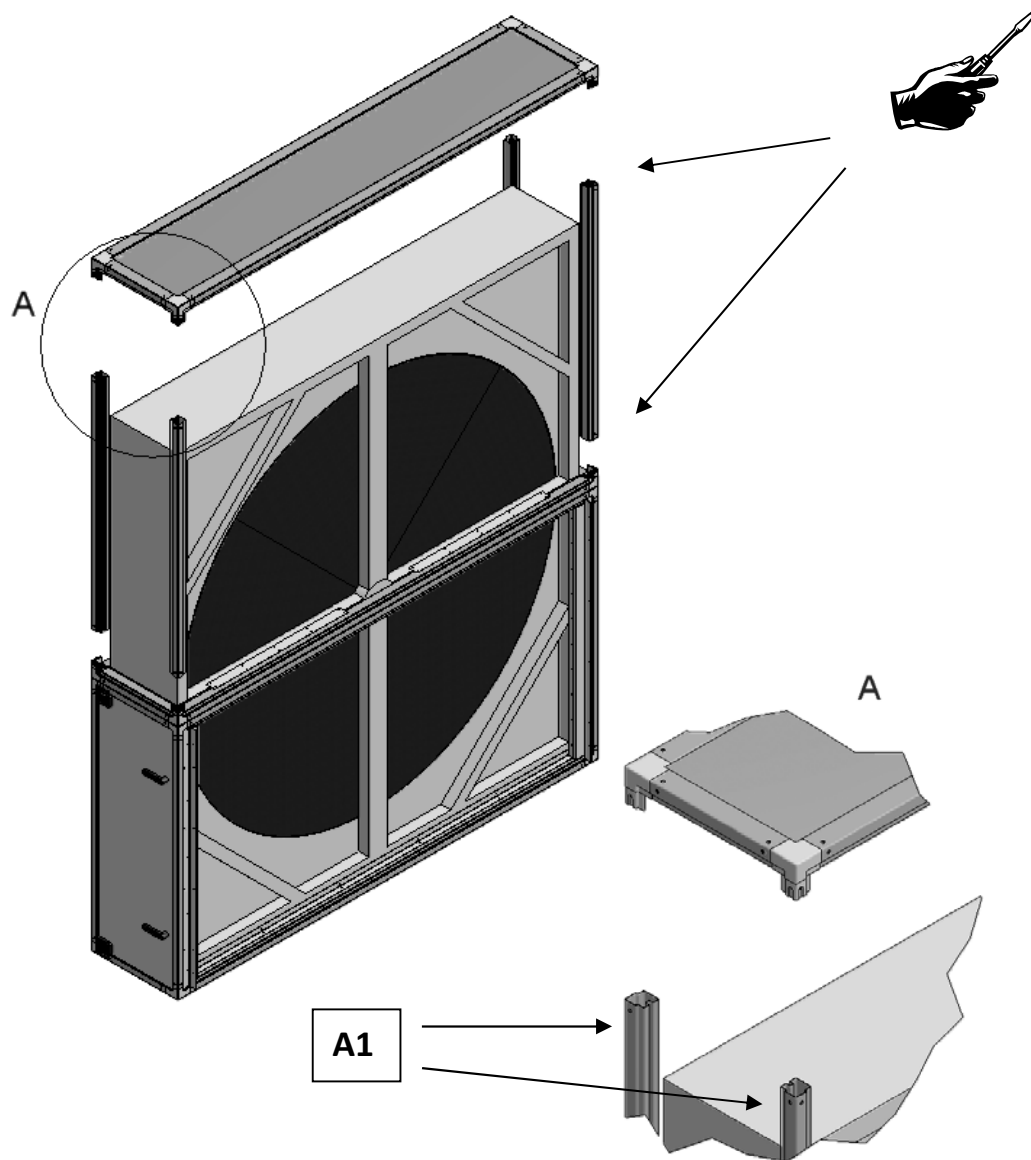
MOUNTING INSTRUCTIONS

for
Rotary Heat
Exchangers in split design
for types:
RRS / RRSE from the
contractual size 3001

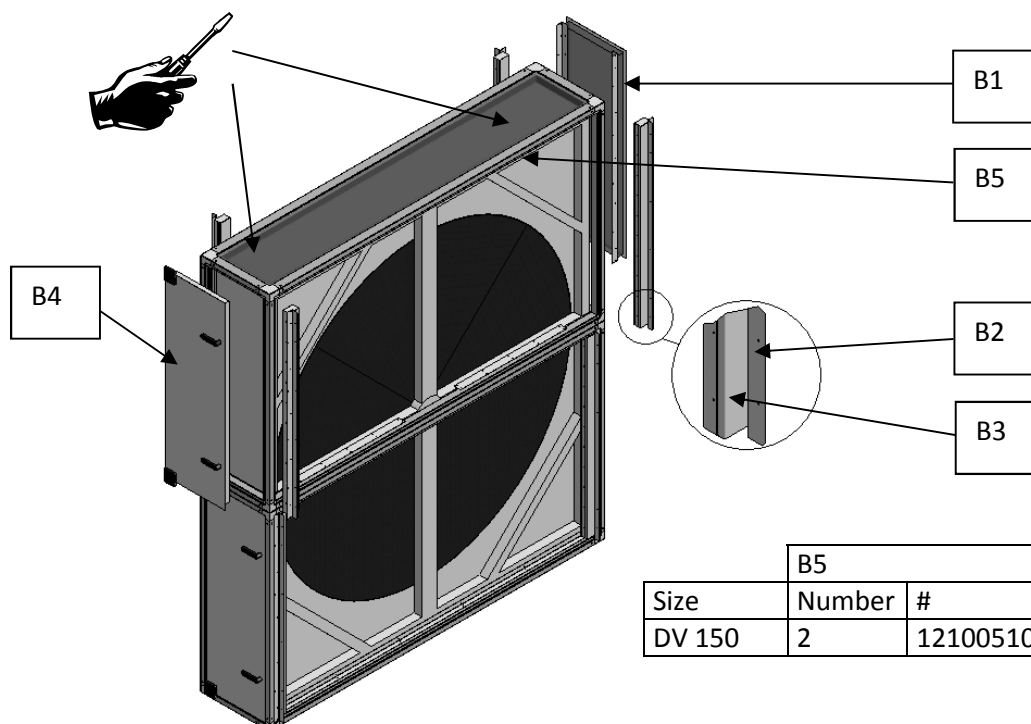
Index
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2. Mounting tools required
3. General conditions by customers
4. Vertical and horizontal division
4.1 Conditions by customers
4.2 Mounting description
4.3 Rectification of the arrangement of bearings
4.4 Mounting in case of restricted space
5. Change vertical/horizontal position
6. Horizontal rollers
6.1 Conditions by customers
6.2 Mounting description
7. Mounting of the drive
8. Mounting for the panels
9. Control works

If you have any queries, please get in touch with:
Klingenburg GmbH - Rothenstraße 115 - 42699 Solingen
Telefon: 0 20 43 1 36 36-0 Telefax: 0 20 43 1 33 63
E-Mail: Klingenburg@Klingenburg.de Internet: www.Klingenburg.de



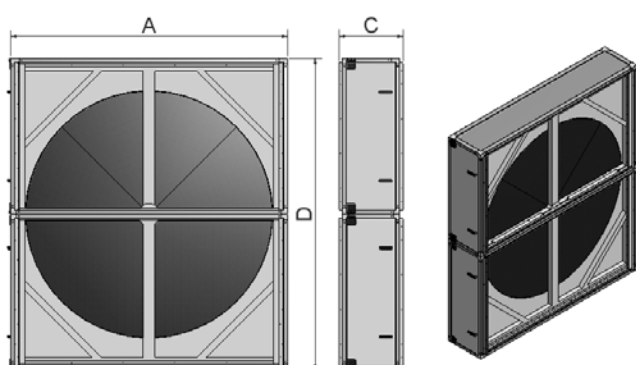


A1		
Size	Quantity	Length (mm)
DV 60	4	1014
DV 80	4	1164
DV 100	4	1314
DV 120	4	1464
DV 150	4	1614



B5		
Size	Number	#
DV 150	2	12100510

	B1		B2		B3		B4	
Size	Quantity	#	Quantity	#	Quantity	#	Quantity	#
DV 60	1	10122310	-	-	-	-	1	10722310
DV 80	1	10122610	4	11200400	4	21000200	1	10722610
DV 100	1	10122710	4	11200410	4	21000210	1	10722710
DV 120	1	10122810	4	12100410	4	21000230	1	10722810
DV 150	1	10122910	4	11200420	4	21000220	1	10722910



Size	A	C	D
DV 60	2170	520	2240
DV 80	2320	588	2540
DV 100	2520	588	2840
DV 120	2890	558	3140
DV 150	3040	558	3440

9.3 Assemble divided rotor for DV 60, DV 80, DV 100, DV 120 og DV 150

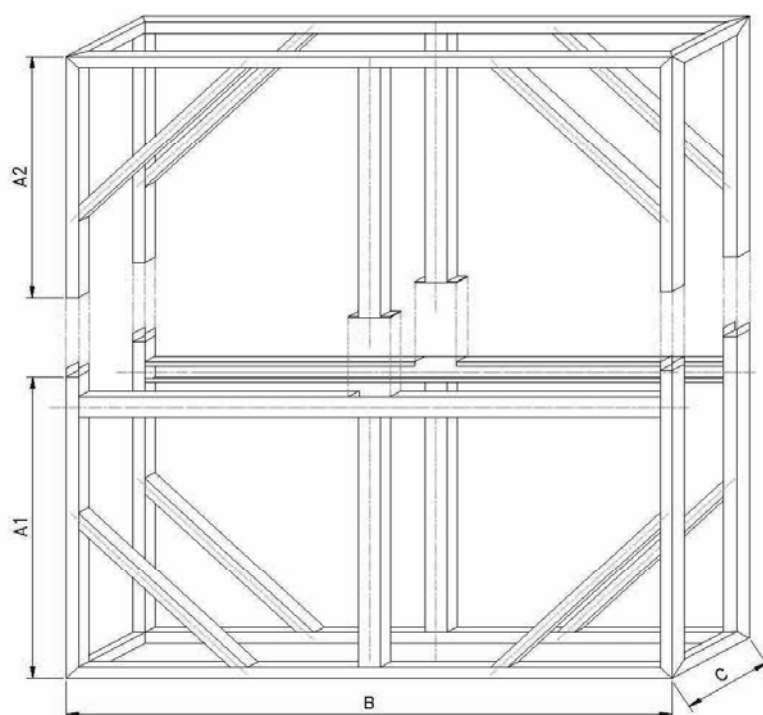


1. Bill of material of the parts delivered

As a standard the frames of the rotary heat exchangers of the constructional sizes RRS/RRSE up to 3000 are made of galvanized steel sheet.

Frame dimensions of the split heat exchangers (without packing) as follows:

RRS / RRSE	Height A1 + A2 (mm)	Lower frame A1 (mm)	Upper frame A2 (mm)	Width (mm)	Depth (mm)
2500	2500	1350	1150	2500	440
2750	2750	1475	1275	2750	440
3000	3000	1600	1400	3000	440





2. Mounting tools required

In addition to the normally used mounting tools we'd recommend the use of:

- Hammer 1500 gr.
- plastic tip hammer
- hardwood
- 2 pieces round bars, $d = 25 \text{ mm}$, $l = 600 \text{ mm}$
- 2 pieces of spanners, respectively, with openings of 17, 19, 24 mm
- flexible reversible ratched handle with
 - socket for wrenches with openings of 7, 8, 17, 19 mm
 - hexagon insert socket driver 4, 6, 8, 10 mm
- electr. impact screwdriver
- engineer's pliers or side cutter
- double ladder
- screwdriver small 2,8 mm
- screwdriver big 10 mm
- 2 pieces drifts made of 12 mm round stock
- joint filling hand pistol, incl. permissible sealing materials

3. General conditions by customers

For stress-free positioning of the rotor the surface shall be flat. External forces of channel connections shall not be lead into the rotor frame. Observe that the rotor is evenly and straightly blown against. For inspection purposes the rotor shall be accessible within the installation.

4. Vertical rotor/horizontal division

4.1 Conditions by customers

A free space of at least 400 mm is required above the rotor because the upper part of the housing is placed after the mounting of the segments. In case this space is not available see details of item 4.3.

4.2 Mounting description

- Alignment of the lower part of the rotor and fixing to the floor.

This work is **not** done by Klingenburg personnel.

Important: Observe correct mounting direction of the rotor for in case of use of a scavenging chamber functioning is no longer given!



Table of frames and storage mass weights as well as the storage mass segments valid for rotary heat exchangers

RRS / RRSE	Storage mass diameter (mm)	compl. weight exchanger (kg)	Weights frame weight (kg)	compl. Storage mass weight (kg)	Segments of storage mass
2500	2340	620	310	310	6
2750	2590	780	410	470	6
3000	2840	1000	600	400	6

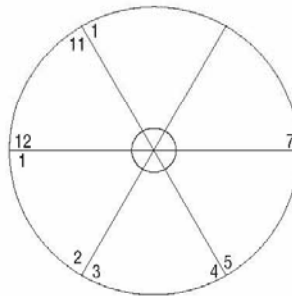
Table of mounting accessories

RRS / RRSE	Mounting accessories of the lower part of the exchanger					
	nut M 16 (DIN 934)	Screw M 10 x 95 and nut (DIN 931 / 985)	Screw M 12 x 16 and nut (DIN 912 / 934)	Screw M 8 x 16 (DIN 912)	V-belt SPA incl. Lock (m)	Dust cover for bearing cover (Piece)
2500	24	12	12	34	8,1	2
2750	24	12	12	34	9,1	2
3000	24	12	12	34	9,6	2

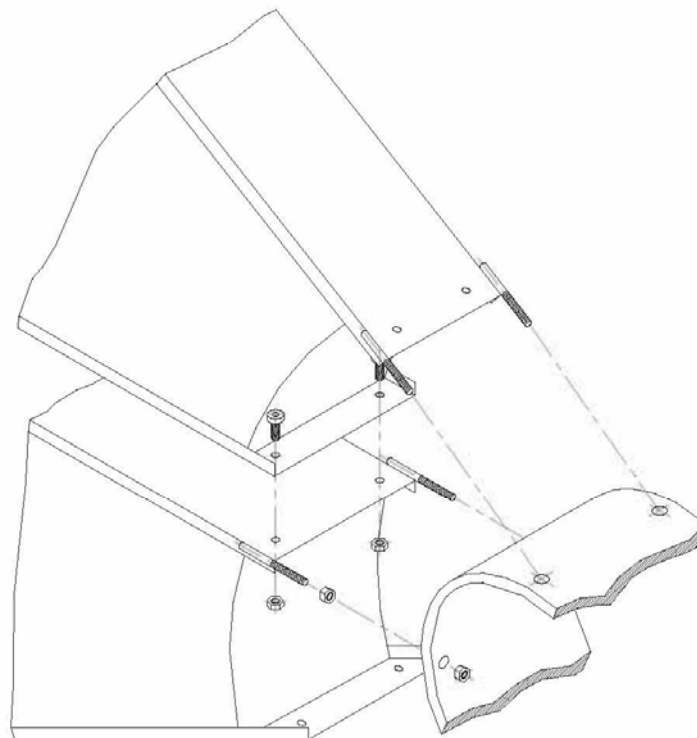


- At delivery, half of the amount of the rotor segments is already assembled and pread-justed. The connection points of the individual segments are numbered continuously.

RRS / RRSE 2500 - 3000



- Block rotor against rotation with 2 pieces round bars, ($d = 25 \text{ mm}$, $l = 600 \text{ mm}$) between the root of the rotor, the welded threaded rods at the bordering sheet and the bearing frame.
- Insert segments according to numbering. The rotor surface shall be protected during these works. Do not use plain washers!

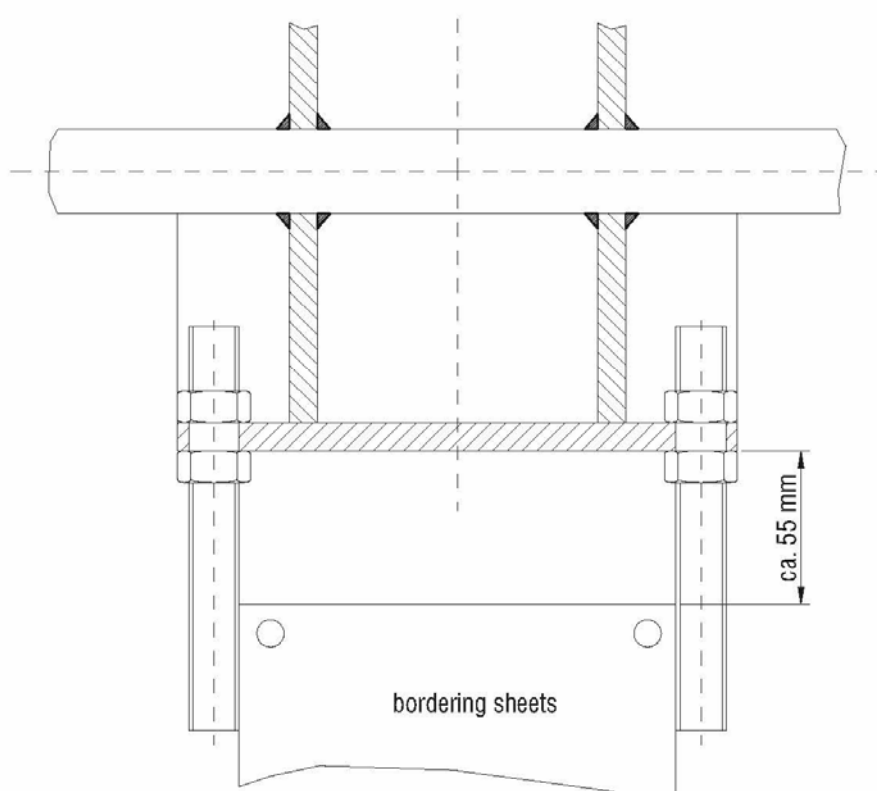


- Fix nuts of the threaded rods by a locknut.



Attention:

The space between the outer edge of the root of the rotor and the bordering sheets shall be at about 55 mm. This measure is only for your orientation to insert all segments. If this measure is not kept it is difficult to insert the last Segment.



- Install external screw fitting of the bordering sheets. Drive home screws.

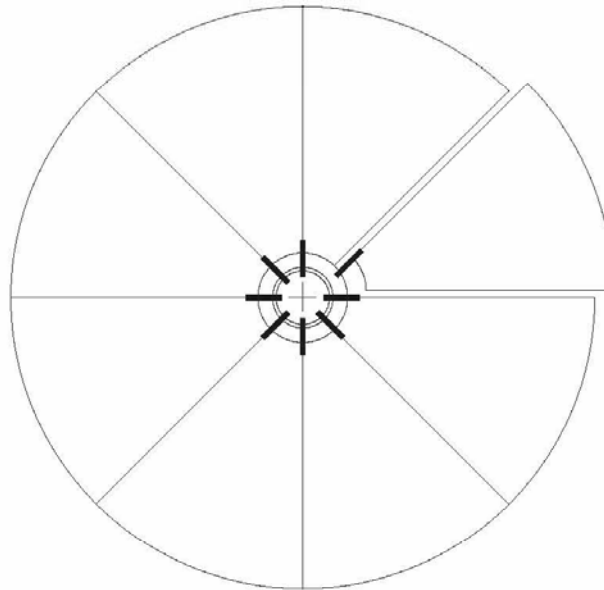
Important:

The bordering sheets shall be contiguous without gap. In case of a gap the nuts at the threaded rods have to be adjusted accordingly.



- In case of jamming of the final segment slightly loosen the neighbouring segments from the root. The final segment can be inserted into the root of the rotor with the threaded rods. In case the air gap of the last mounted segment is too big all segments have to be fetched about 2 to 4 mm closer to the root of the rotor.

Important: Drive home all screws, otherwise depth impact!



4.3 Redressing of the arrangement of bearings

The rotor bearing is basically adjusted by the manufacturer. In case of twisted assembly of the rotor, however, it maybe necessary to redress the bearing.

- Mark segment bordering
- Turn rotor to the position where marked border is upside down
- Meter the distance of segment borders to rotor frame
- Turn marked border upside
- Repeat metering
- Both dimensions have to correspond with an allowance of + 2 mm
- Line bearing, if necessary
- Turn rotor to position where marked bordering is horizontal to rotor axle
- Meter distance of segment borderings to rotor frame
- Turn marked border to the other side
- Repeat metering
- Both dimensions have to correspond with an allowance of + 2 mm.
- Adjust one of the two bearings on the border frame, if necessary

Now, the rotor bearing is adjusted.

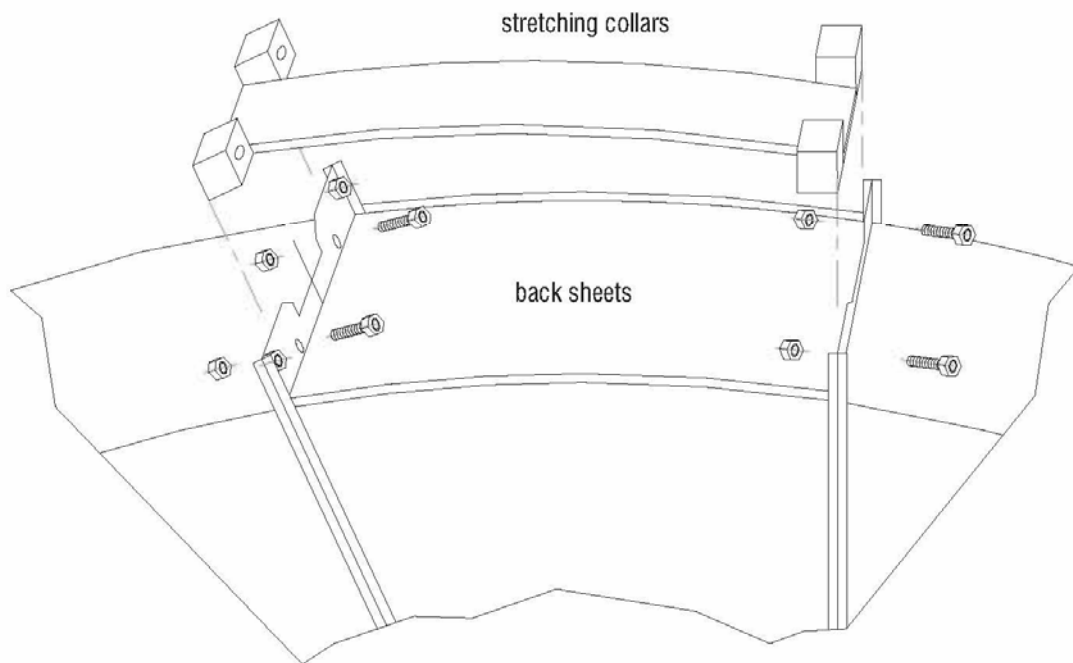


- The individual segments are adjusted at the threaded rods of the root of the rotor. A side impact exceeding 3 mm shall not be permitted.

With rotors **up to the constructional size RRS/RRSE 3000**, now back sheets and allround-stretching collars are mounted and tensed. Check again rotor alignment before final fastening of the screw connections.

Important: Even screw down of the stretching collars (2 stages)

- Fasten screws until even tensioning of the segments is visible.
- Coining of the stretching collars along the entire circumferential by means of a plastic tip hammer or hard wood and hammer. Then, refastening of all screw connections.
- Check wobble and depth impact.



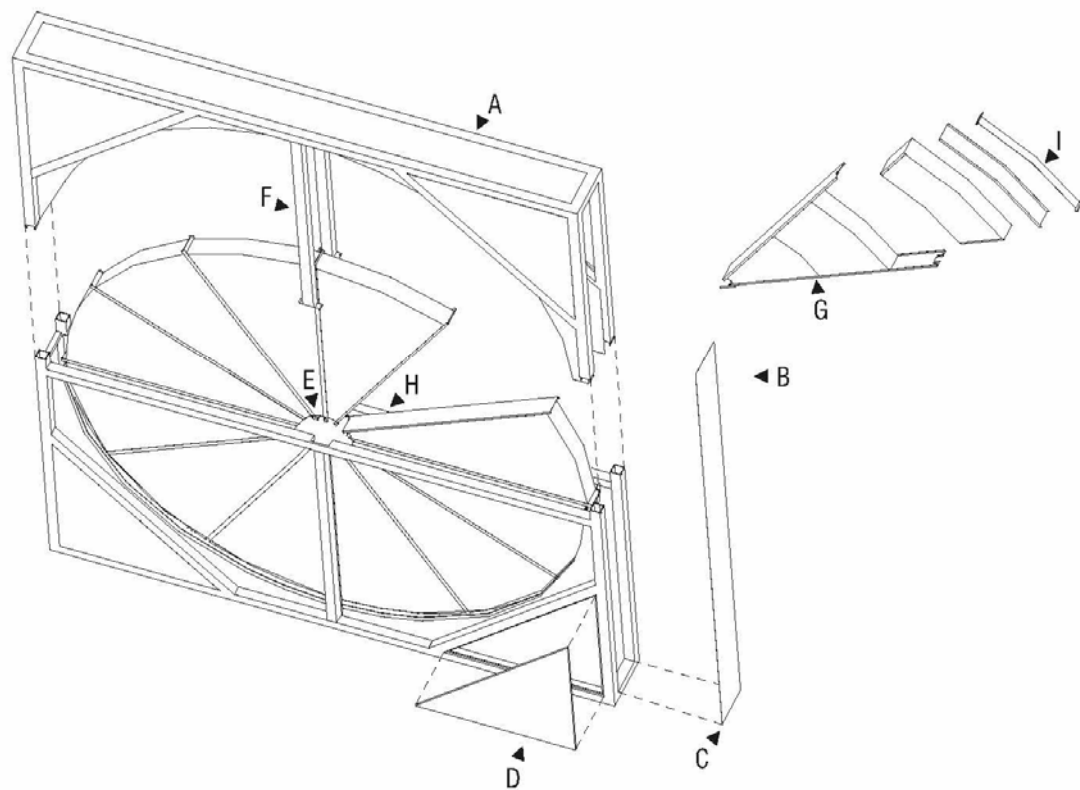
- Screw down tightly all screw connections.
- Place upper part of the housing and screw it down.



4.4 Mounting in case of restricted space

In case of insufficient space (400 mm) above the rotor the rotor housing can be assembled before inserting segments. According to the figure, the upper rotor edge can be removed. The unscrewable edge is always located above the driving motor. The rotor segments can be mounted through this opening.

- about this see item 4.2.



- A) Housings are split from rotor size 2500 on
- B) The rotors are lined with removable sheets
- C) The motor is accessible from the front, from 2500 on by a triangular door
- D) Mounting edge always located above driving motor
- E) External bearings
- F) Bearing support stretcher
- G) Rotor sector
- H) Rotor cup
- I) Stretching collar



5. Upright rotor/vertical division

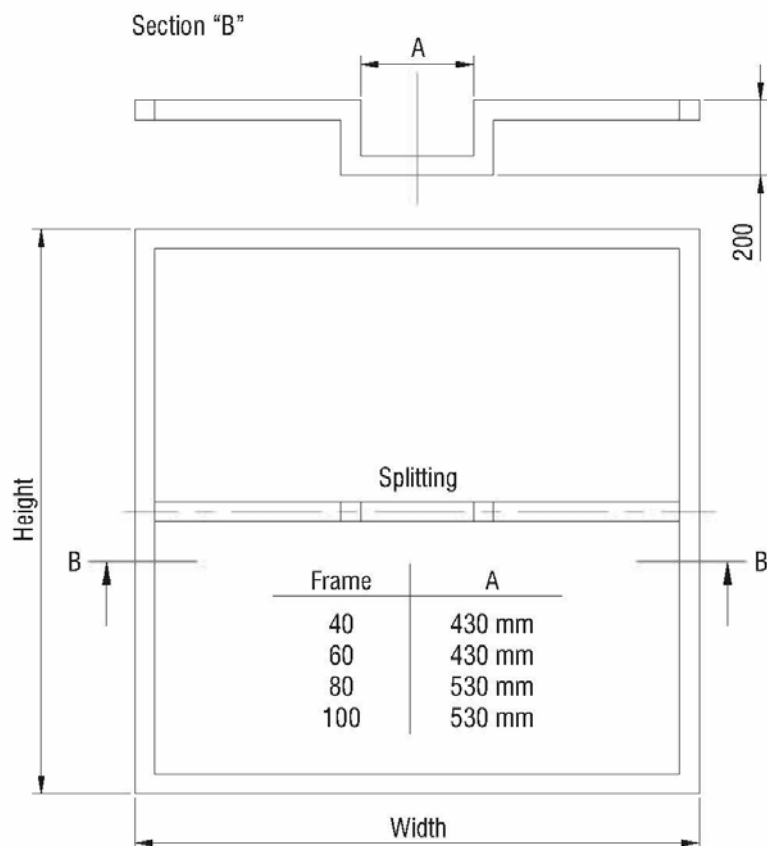
In some rare cases it may be necessary to vertically split the rotor housing. The housing, then basically, has to be completely assembled before inserting the segments. Mounting of the segments according to item 4.3.

6. Horizontal rotors

6.1 Conditions by customers

For stress-free positioning of the rotor the surface shall be flat. External forces of channel connections shall not be lead into the rotor frame. Observe that the rotor is evenly and straightly blown against.

Important: By customers, the point of support of the lower rotor bearing shall be solidly supported and easily accessible for maintenance purposes. The following describes our proposal for a corresponding design.





6.2 Mounting description

- Place housing part containing the premounted half of the rotor mass onto the seat construction.
- Stick second part of the housing and fasten frame with supporting construction.

Important: Observe correct mounting direction of the rotor!

Due to its dead weight the rotor settles about 5 mm as soon as the rotor is layed down. Therefore, the premounted rotor segments are pretensioned to this measure. Mounting of the segments is done analogous to the mounting of the upright rotors. For this see item 4.2. and 4.4.

7. Mounting of the drive

The rotor drive is premounted by the manufacturer. It is fixed to a motor-driven rocker dolly switch, which itself is kept tensioned by a tension spring. The V-belt is loosely attached. The flex connector is premounted on one side.

- Fix one end of the V-belt to the rotor circumferential by means of an adhesive or a wire and draw it around the wheel by turning the rotor.
- Shorten belt which is delivered with overlength to necessary size.
- Connect ends with flex connector.
- Put belt on pulley.
- See that V-belt is sufficiently tensioned and does not abrade at the housing.
- V-belt stretchens during operation. Thus, if necessary, it needs to be shortened.

8. Mounting of the gaskets

Center and circumferential gaskets are premounted by manufacturer. Do not press gaskets against rotor mass because the motor is exceedingly retarded and may be damaged.

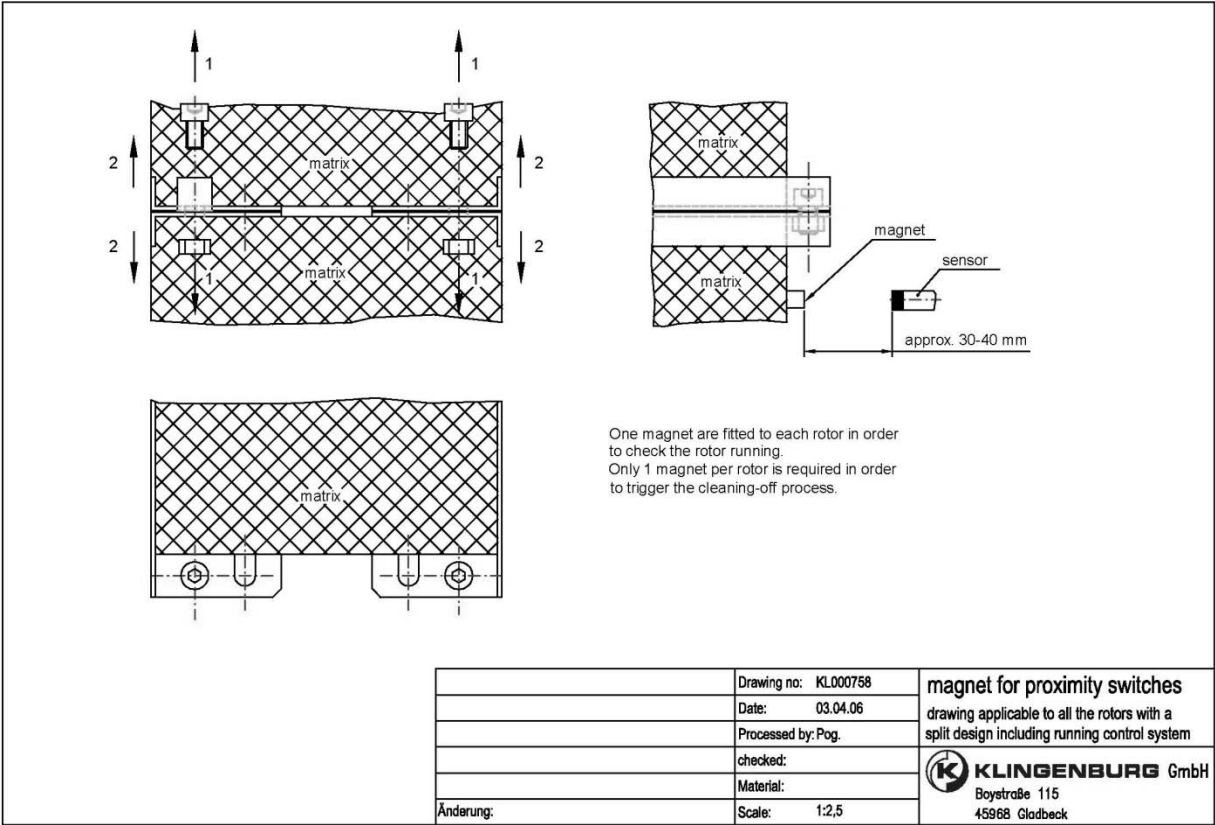
Hint: Push gaskets to final position during slow rotation of the rotor.

9. Controll works

After mounting of lateral sheet and doors the eventually existing leakages can be caulked with permanently elastic sealing material.

- Check wobble an height impact of the rotor.
- Check fastening of all screw connections.
- Check correct tensioning of the V-belt.

For informations about the connection of the driving motor see controller documentation. Fix air conduits with sheet metal screws to aluminum frame.



9.4 Assemble divided rotor for DV 190 og DV 240

1. Stückliste | 1. Bill of material

1. Stückliste der gelieferten Teile

Die Rahmen der Rotationswärmetauscher der Baugrößen RRS ab 3001 werden standardmäßig aus verzinktem Stahlblech produziert.

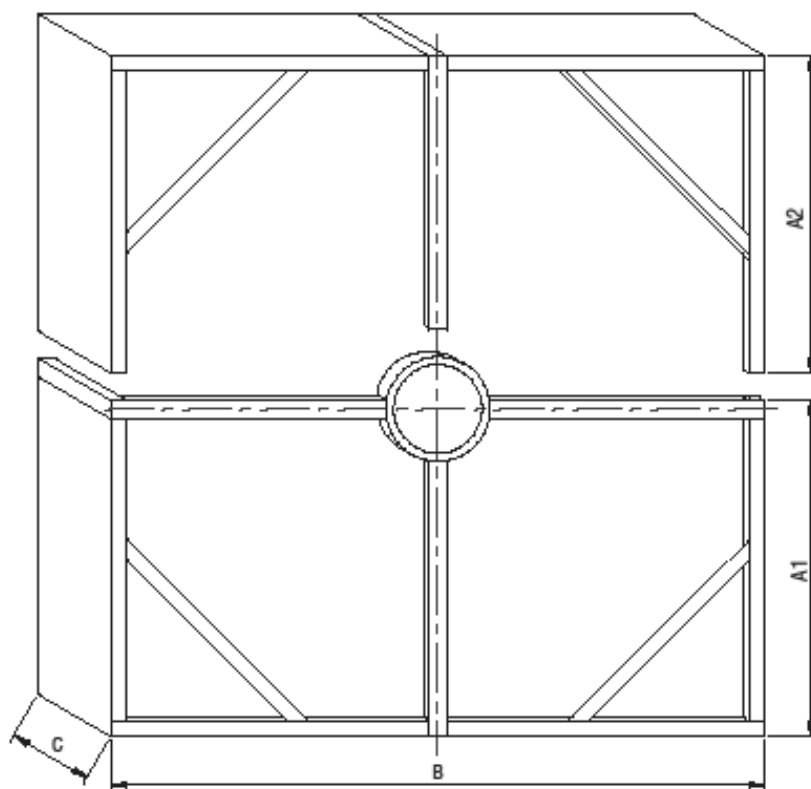
Nachfolgend die Rahmenmaße der geteilten Rotationswärmetauscher (ohne Verpackung):

1. Bill of material of the parts delivered

As a standard the frames of the rotary heat exchangers of the constructional sizes RRS from 3001 are made of galvanized steel sheet.

Frame dimensions of the split heat exchangers (without packing) as follows:

RRS	Höhe Heigh A1 + A2 (mm)	Unterrahmen Lower Frame A1 (mm)	Oberrahmen Upper frame A2 (mm)	Breite Width (mm)	Tiefe Depth (mm)
3500	3500	1800	1700	3500	550
4000	4000	2050	1950	4000	550
4500	4500	2300	2200	4500	550



2. Erforderliche Montagewerkzeuge

Zusätzlich zu normalen Montagewerkzeugen empfehlen wir:

- Hammer 1500 gr.
- Kunststoffhammer
- Hartholz
- 2 Stück Rundstangen D = 25 mm, L = 600 mm
- je 2 Stück Maulschlüssel 17, 19, 24 mm Schlüsselweite
- Gelenk-Umschaltknaur mit
 - Steckschlüsselsteinsätze 7, 8, 17, 19 mm Schlüsselweite
 - Einsätze für Innensechskant 4, 6, 8, 10 mm
- elektr. Schlagschrauber
- Kombizange oder Seitenschneider
- Steh- oder Bockleiter
- Schraubendreher klein 2,8 mm
- Schraubendreher groß 10 mm
- 2 Stück Dorne aus 12 mm Rundmaterial
- Handfugerpistole incl. Kartuschen mit zulässigen Dichtungs-
mitteln

2. Mounting tools required

In addition to the normally used mounting tools we recommend the use of:

- Hammer 1500 gr.
- plastic tip hammer
- hardwood
- 2 pieces round bars, d = 25 mm, l = 600 mm
- 2 pieces of spanners, respectively, with openings of 17, 19, 24 mm
- flexible reversible ratched handle with
 - socket for wrenches with openings of 7, 8, 17, 19 mm
 - hexagon insert socket driver 4, 6, 8, 10 mm
- electrical impact screw driver
- engineer's pliers or side cutter
- double ladder
- screw driver small 2,8 mm
- screw driver big 10 mm
- 2 pieces drifts made of 12 mm round stock
- joint filling hand pistol, incl. permissable sealing materials

3. Allgemeine bauseitige Voraussetzungen

Der Untergrund muß eben sein, so daß der Rotor spannungsfrei aufsteht. Äußere Kräfte durch Kanalanschlüsse dürfen nicht in den Rotorahmen eingeleitet werden. Es ist darauf zu achten, daß der Rotor gleichmäßig und gerade angeströmt wird. Der Rotor muß in der Anlage zugänglich sein, um Inspektionsarbeiten durchführen zu können.

3. General conditions by customers

For stress-free positioning of the rotor the surface shall be flat. External forces of channel connections shall not be lead into the rotor frame. Observe that the rotor is evenly and straightly blown against. For inspection purposes the rotor shall be accessible within the installation.

4. Stehender Rotor / waagerechte Teilung

4.1 Bauseitige Voraussetzungen

Da das Gehäuseoberteil nach der Montage der Segmente aufgesetzt wird, ist oberhalb des Rotors ein freier Raum von mindestens 400 mm erforderlich. Steht dieser Raum nicht zur Verfügung, lesen Sie bitte die Ausführungen unter Punkt 4.4 auf Seite 10.

4. Vertical rotor/horizontal division

4.1 Conditions by customers

A free space of at least 400 mm is required above the rotor because the upper part of the housing is placed after the mounting of the segments. In case this space is not available see details of item 4.4 on page 10.

4.2 Montagebeschreibung

Ausrichten des Rotorunterteils und Befestigung am Boden. Diese Arbeit wird **nicht** durch Klingenburg-Monteur durchgeführt.



Wichtig:

Achten Sie darauf, daß der Rotor richtig herum montiert wird, da ansonsten beim Einsatz einer Spülkammer die Funktion nicht mehr gegeben ist.

4.2 Mounting description

Alignment of the lower part of the rotor and fixing to the floor. This work is **not** done by Klingenburg personnel.



Important:

Observe correct mounting direction of the rotor for in case of use of a scavenging chamber functioning is no longer given!

4.2 Montagebeschreibung | 4.2 Mounting description

Aufstellung der Rahmen und Speichermassengewichte sowie Anzahl der Speichermassensegmente gültig für geteilte Rotationswärmetauscher

Table of frames and storage mass weights as well as the storage mass segments valid for rotary heat exchangers

RRS	Speichermasse Storage mass Ø (mm)	Gewicht komplett Tauscher complete weight exchanger [kg]	Gewicht Rahmen frame weight [kg]	Gewicht komplette Speichermasse compl. storage mass weight [kg]	Segmente der Speichermasse Segments of storage mass [kg]
3500	3260	1170	630	540	8
4000	3760	1790	990	800	12
4500	4260	2120	1125	995	12

Aufstellung des Montagezubehörs

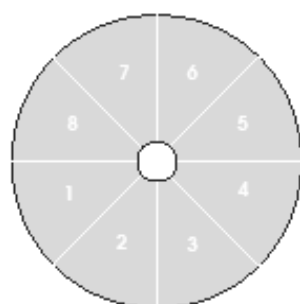
Table of mounting accessories

RRS	Montagezubehör im Unterteil des Tauschers Mounting accessories of the lower part of the exchanger			
	Mutter M16	Schraube M10x95 und Mutter	Schraube M12x16 und Mutter	Schneidschraube 4,8x19 mm
	Nut M16	Screw M10x95 and nut	Screw M12x16 and nut	Grub screw 4,8x19
	DIN 934	DIN 934/985	DIN 912/934	
3500	32	16	32	20
4000	48	24	48	20
4500	48	24	48	20

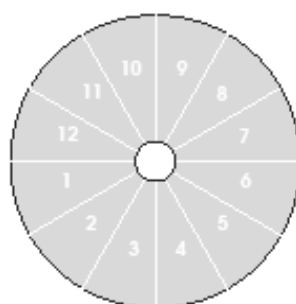
RRS	Keilriemen SPA inkl. Schloss V-belt SPA incl. Lock [m]	Staubdeckel zur Lagerabdeckung Dust cover for bearing cover Stück / Piece	Blindniete Stahl 3x6 mm Blind rivet steel 3x6 mm	Schraube M12x30 Screw M12x30 DIN 912	Selbstsichernde Mutter M12 Self locking nut M12 DIN 985
3500	11,2	2	20	8	8
4000	12,9	2	20	8	8
4500	14,6	2	20	8	8

4.2 Montagebeschreibung | 4.2 Mounting description

Bei Anlieferung sind bereits die Hälfte der Rotorsegmente montiert und vorgeichtet. Die Verbindungsstellen der einzelnen Segmente sind fortlaufend nummeriert.



RRS D=2801 • 3759



RRS D=3760 • 4760

At delivery, half of the amount of the rotor segments is already assembled and pre-adjusted. The connection points of the individual segments are numbered continuously.

■ Blockieren Sie den Rotor mit 2 Stück Rundstangen (D=25 mm, Länge=600 mm) zwischen Rotornabe, den angeschweißten Gewindestangen am Einfassungsblech und dem Lagersteg gegen Drehung.

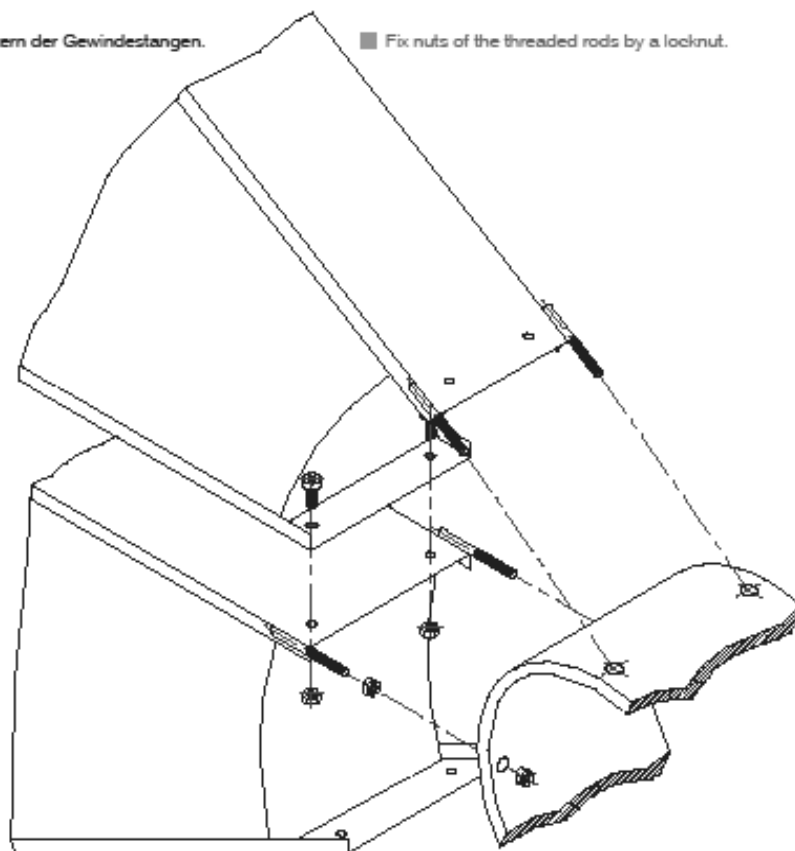
■ Block rotor against rotation with 2 pieces round bars, (d=25 mm, l=600 mm) between the root of the rotor, the welded threaded rods at the bordering sheet and the bearing frame.

■ Einsetzen der Segmente gemäß Numerierung. Die Rotoroberfläche sollte dabei geschützt werden. Keine Unterlegscheiben verwenden!

■ Insert segments according to numbering. The rotor surface shall be protected during these works. Do not use plain washers!

■ Kontorn Sie die Muttern der Gewindestangen.

■ Fix nuts of the threaded rods by a locknut.



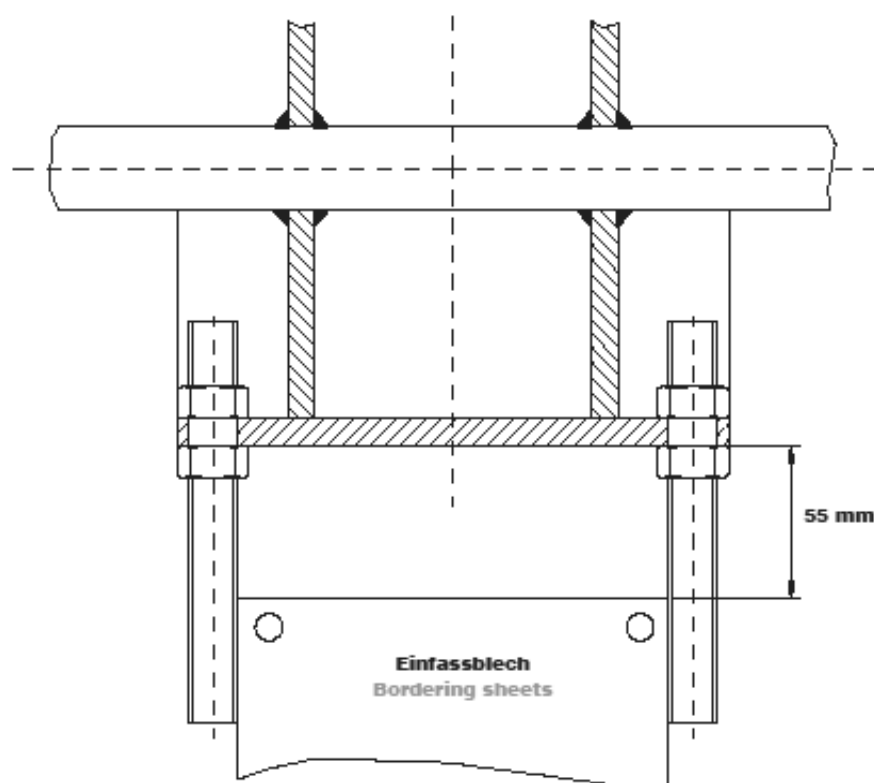
4.2 Montagebeschreibung | 4.2 Mounting description

Achtung:

Der Abstand zwischen Außenkante Rotormabe und den Einfassblechen sollte ca. 55 mm betragen. Dieses Maß ist nur ein Anhaltswert, um alle Segmente einbringen zu können. Wird dieses Maß unterschritten, treten Schwierigkeiten beim Einbringen des letzten Segmentes auf.

Important

The space between the outer edge of the root of the rotor and the bordering sheets shall be at about 55 mm. This measure is only for your orientation to insert all segments. If this measure is not kept it is difficult to insert the last segment.



■ Bringen Sie die Außenverschraubungen der Einfassungsbleche an. Schrauben festziehen.

■ Install external screw fitting of the bordering sheets. Drive home screws.

Wichtig

Die Einfassungsbleche der Segmente müssen ohne Spalt aneinanderliegen. Falls ein Spalt vorhanden ist, müssen die Muttern an den Gewindestangen verstellt werden.

Important

The bordering sheets shall be contiguous without gap. In case of a gap the nuts at the threaded rods have to be adjusted accordingly.

4.2 Montagebeschreibung | 4.2 Mounting description

■ Sollte das letzte Segment klemmen, schrauben Sie bitte die benachbarten Segmente etwas aus der Nabe heraus.

■ In case of jamming of the final segment slightly loosen the neighbouring segments from the root.

Mit den Gewindestangen in der Rotornabe können Sie das letzte Segment einbringen. Ist der Luftspalt des zuletzt montierten Segmentes zu groß, müssen sämtliche Segmente um ca. 2 bis 4 mm näher an die Rotornabe herangezogen werden.

The final segment can be inserted into the root of the rotor with the threaded rods. In case the air gap of the last mounted segment is too big all segments have to be fetched about 2 to 4 mm closer to the root of the rotor.



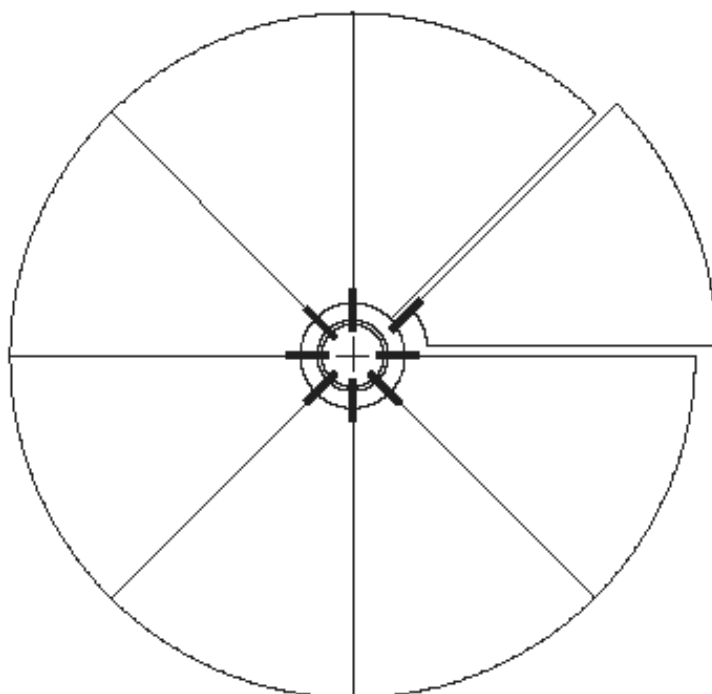
Wichtig:

Alle Segmente nachziehen, sonst Tiefenschlag!



Important:

Drive home all screws, otherwise depth impact!



4.3 Nachrichten der Rotorlagerung

Grundsätzlich ist die Rotorlagerung im Werk ausgerichtet. Sollte der Rotor jedoch verspannt eingebaut sein, kann ein Nachrichten erforderlich werden.

4.3 Redressing of the arrangement of bearings

The rotor bearing is basically adjusted by the manufacturer. In case of twisted assembly of the rotor, however, it maybe necessary to redress the bearing.

- Markieren Sie hierzu eine Segmenteinfassung
- Drehen Sie den Rotor, so daß die markierte Einfassung unten liegt.
- Messen Sie den Abstand der Segmenteinfassung zum Rotorrahmen

- Mark segment bordering
- Turn rotor to the position where marked border is upside down
- Meter the distance of segment borders to rotor frame

4.3 Nachrichten der Rotorlagerung | 4.3 Redressing of the arrangement of bearings

- Drehen Sie die markierte Einfassung nach oben
- Wiederholen Sie die Messung
- Beide Maße müssen mit einer Abweichung von + 2 mm übereinstimmen
- Falls erforderlich, unterfüllen Sie die Lagerung
- Drehen Sie den Rotor, so daß die markierte Einfassung horizontal zur Rotorachse liegt
- Messen Sie den Abstand der Segmenteinfassung zum Rotorrahmen
- Drehen Sie die markierte Einfassung auf die andere Seite.
- Wiederholen Sie die Messung
- Beide Maße müssen mit einer Abweichung von + 2 mm übereinstimmen
- Falls erforderlich, verschieben Sie eines der beiden Lager auf dem Lagersteg

Die Rotorlagerung ist nun ausgerichtet.

- Die einzelnen Segmente werden an den Gewindestangen in der Rotormabe ausgerichtet. Ein Seitenschlag von mehr als 3 mm sollte nicht erlaubt sein

Bei Rotoren **ab der Baugröße RRS 3001** werden nun die Rückenbleche und Rundumspannreifen montiert und gespannt. Prüfen Sie vor dem endgültigen Anziehen der Verschraubungen noch einmal die Rotorausrichtung.

Wichtig: Gleichmäßiges Verschrauben der Spannreifen (2 Durchgänge):

- Schrauben anziehen, bis ein einheitliches Verspannen der Segmente zu sehen ist
- Mit einem Kunststoffhammer bzw. Hartholz und Handhammer die Spannreifen über den ganzen Umfang nachschlagen. Dann alle Verschraubungen nachziehen
- Seiten- und Tiefenschlag überprüfen
- Ziehen Sie sämtliche Verschraubungen fest an
- Setzen Sie das Gehäuseoberteil auf und verschrauben Sie es

- Turn marked border upside
- Repeat metering
- Both dimensions have to correspond with an allowance of + 2 mm
- Line bearing, if necessary
- Turn rotor to position where marked bordering is horizontal to rotor axle
- Meter distance of segment borderings to rotor frame
- Turn marked border to the other side
- Repeat metering
- Both dimensions have to correspond with an allowance of + 2 mm.
- Adjust one of the two bearings on the border frame, if necessary

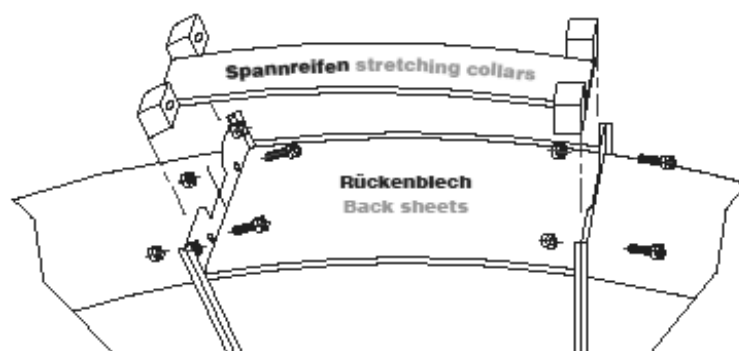
Now, the rotor bearing is adjusted.

- The individual segments are adjusted at the threaded rods of the root of the rotor. A side impact exceeding 3 mm shall not be permitted.

With rotors from the constructional size RRS 3001, now back sheets and allround-stretching collars are mounted and tensed. Check again rotor alignment before final fastening of the screw connections.

Important: Even screw down of the stretching collars (2 stages):

- Fasten screws until even tensioning of the segments is visible.
- Coining of the stretching collars along the entire circumferential by means of a plastic tip hammer or hard wood and hammer. Then, refastening of all screw connections.
- Check wobble and depth impact.
- Screw down tightly all screw connections.
- Place upper part of the housing and screw it down.



4.4 Montage unter beengten Platzverhältnissen

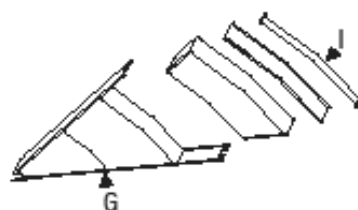
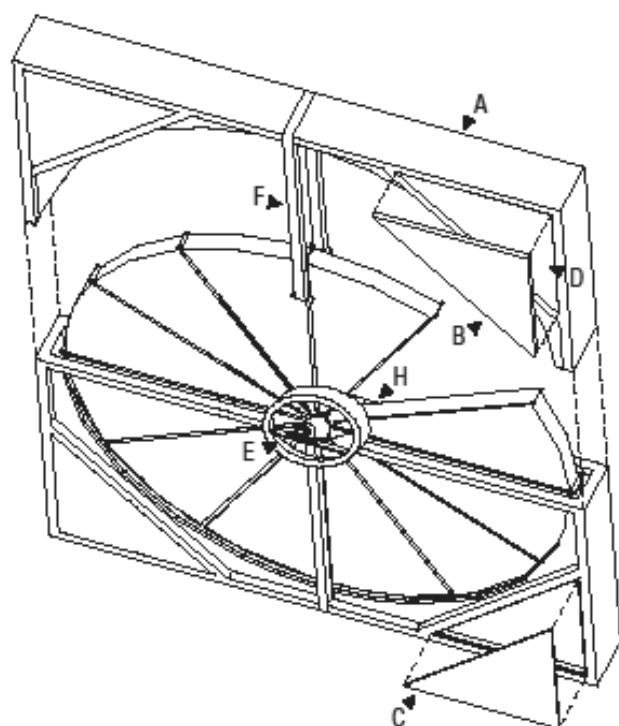
Steht Ihnen oberhalb des Rotors kein ausreichender Raum (ca. 400 mm) zur Verfügung, können Sie das Rotorgehäuse vor dem Einbringen der Segmente zusammensetzen. Wie in der Zeichnung ersichtlich, kann dann eine obere Rotorecke demontiert werden. Diese abschraubbare Ecke befindet sich immer überhalb des Antriebsmotors. Durch diese Öffnung werden dann die Rotorsegmente montiert.



Siehe hierzu Punkt 4.2



About this see item 4.2.



- A) Ab Rotorgröße 2500 sind die Gehäuse geteilt
- B) Die Rotoren sind mit abnehmbaren Dreiecksblechen ausgekleidet
- C) Der Motor ist durch Dreieckstür zugänglich
- D) Montageecke immer überhalb des Antriebsmotors.
- E) Außenliegende Lager
- F) Lagerstützstrebe
- G) Rotorsektor
- H) Rotortopf
- I) Spannreifen

- A) Housings are split from rotor size 2500 on
- B) The rotors are lined with removable sheets
- C) The motor is accessible by a triangular door
- D) Mounting edge always located above driving motor
- E) External bearings
- F) Bearing support stretcher
- G) Rotor sector
- H) Rotor cup
- I) Stretching collar

5. Stehender Rotor / Senkrechte Teilung

In seltenen Fällen kann es erforderlich sein, das Rotorgehäuse senkrecht zu teilen. Das Gehäuse muß dann grundsätzlich vor dem Einbringen der Segmente komplett zusammengebaut werden. Die Montage der Segmente erfolgt dann wie unter Punkt 4.2 beschrieben.

5. Upright rotor / vertical division

In some rare cases it may be necessary to vertically split the rotor housing. The housing, then basically, has to be completely assembled before inserting the segments. Mounting of the segments according to item 4.2.

6. Liegende Rotoren

6.1 Bauseitige Voraussetzung

Der Untergrund muß eben sein, so daß der Rotor spannungsfrei aufliegt. Äußere Kräfte durch Kanalanschlüsse dürfen nicht in den Rotorahmen eingeleitet werden. Es ist darauf zu achten, daß der Rotor gleichmäßig und gerade angeströmt wird.



Wichtig:

Der Auflagepunkt des unteren Rotorlagers ist bauseits stabil zu unterstützen und zwecks Wartungszwecken leicht zugänglich sein. Hierzu unseren Vorschlag einer entsprechenden Konstruktion.

6. Horizontal rotors

6.1 Conditions by customers

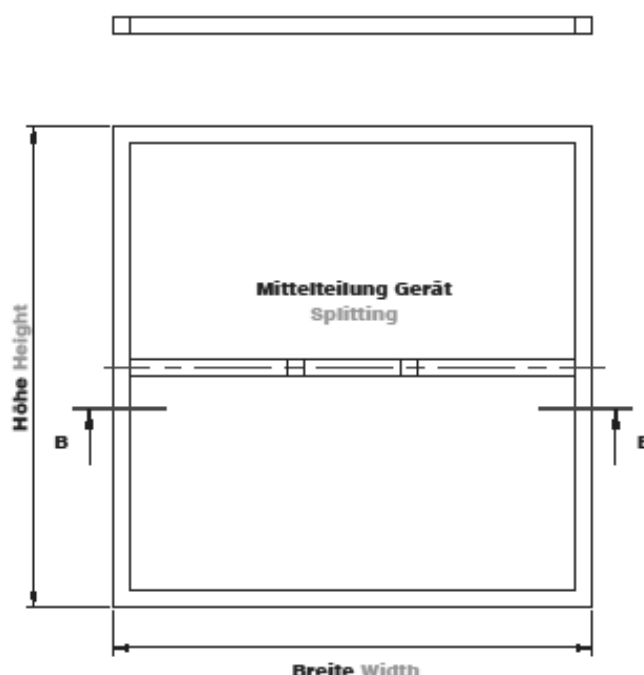
For stress-free positioning of the rotor the surface shall be flat. External forces of channel connections shall not be lead into the rotor frame. Observe that the rotor is evenly and straightly blown against.



Important:

By customers, the point of support of the lower rotor bearing shall be solidly supported and easily accessible for maintenance purposes. The following describes our proposal for a corresponding design.

Schnitt B
Section B



6.2 Montagebeschreibung

Legen Sie die Gehäusehälfte, in der die halbe Rotormasse vormontiert ist, auf die Aufnahmekonstruktion. Stecken Sie die andere Gehäusehälfte auf und befestigen Sie den Rahmen mit der Stützkonstruktion.



Wichtig:

Achten Sie darauf, daß der Rotor richtig herum montiert wird!

Die Rotorpakete setzen sich aufgrund ihres Eigengewichtes um ca. 5 mm, sobald der Rotor gelegt wird. Deshalb sind die vormontierten Rotorpakete um dieses Maß vorgespannt. Die Montage der Segmente verläuft analog zu der der stehenden Rotoren. Lesen Sie dazu bitte unter Punkt 4.2. und Punkt 4.4.

6.2 Mounting description

Place housing part containing the premounted half of the rotor mass onto the seat construction.

Stick second part of the housing and fasten frame with supporting construction.



Important:

Observe correct mounting direction of the rotor!

Due to its dead weight the rotor settles about 5 mm as soon as the rotor is layed down. Therefore, the premounted rotor segments are pretensioned to this measure. Mounting of the segments is done analogous to the mounting of the upright rotors. For this see item 4.2. and 4.4.



7. Montage des Antriebs

Der Rotorantrieb ist werkseitig vormontiert worden. Er ist auf einer Motorwippe befestigt, die durch eine Zugfeder unter Spannung gehalten wird. Der Keilriemen ist lose beigelegt. Der Gelenkverbinder ist einseitig vormontiert.

- Befestigen Sie ein Ende des Riemens mit einem Klebeband oder Draht am Rotorumfang und ziehen Sie es durch Drehung des Rotors um das Rad herum.
- Kürzen Sie den Riemen, der mit Überlänge geliefert wird, auf das erforderliche Maß.
- Verbinden Sie die Enden mit dem Gelenkverbinder
- Legen Sie ihn auf die Riemenscheibe auf
- Achten Sie darauf, daß der Keilriemen ausreichend gespannt ist und nicht am Gehäuse schleift
- Während des Betriebes verlängert sich der Keilriemen. Er muß gegebenenfalls gekürzt werden



7. Mounting of the drive

The rotor drive is premounted by the manufacturer. It is fixed to a motor-driven rocker dolly switch, which itself is kept tensioned by a tension spring. The V-belt is loosely attached. The flex connector is premounted on one side.

- Fix one end of the V-belt to the rotor circumferential by means of an adhesive or a wire and draw it around the wheel by turning the rotor.
- Shorten belt which is delivered with overlength to necessary size.
- Connect ends with flex connector.
- Put belt on pulley.
- See that V-belt is sufficiently tensioned and does not abrade at the housing.
- V-belt stretches during operation. Thus, if necessary, it needs to be shortened.

8 Montage der Dichtungen | 8 Mounting of the gaskets

8. Montage der Dichtungen

Die Mittel- und Rundumdichtungen sind ab Werk vormontiert. Zu starkes Andrücken der Dichtungen gegen die Rotormasse ist zu vermeiden, da der Motor dadurch zu stark gebremst wird und beschädigt werden kann.



Tipp:

Schieben Sie die Dichtungen bei langsam drehendem Rotor in ihre endgültige Position.

8. Mounting of the gaskets

Center and circumferential gaskets are premounted by manufacturer. Do not press gaskets against rotor mass because the motor is exceedingly retarded and may be damaged.



Hint:

Push gaskets to final position during slow rotation of the rotor.

9. Kontrollarbeiten

Nachdem Sie die Seitenbleche und Türen angebracht haben, können Sie eventuelle Undichtigkeiten mit dauerelastischem Dichtungsmaterial abdichten.

- Prüfen Sie den Seiten- und Höhengschlag des Rotors
- Prüfen Sie, ob sämtliche Verschraubungen angezogen sind
- Prüfen Sie, ob der Keilriemen ausreichend gespannt ist

Informationen zum Anschluß des Antriebsmotors entnehmen Sie bitte den Reglerunterlagen.

Die Luftkanäle werden mit Blechtreibschrauben am Aluminiumrahmen befestigt.

9. Control works

After mounting of lateral sheet and doors the eventually existing leakages can be caulked with permanently elastic sealing material.

- Check wobble an height impact of the rotor.
- Check fastening of all screw connections.
- Check correct tensioning of the V-belt.

For informations about the connection of the driving motor see controller documentation.

Fix air conduits with sheet metal screws to aluminum frame.

Wir hoffen Ihnen mit dieser Anleitung geholfen zu haben. Sollten jedoch einmal Probleme oder Fragen auftauchen, so kontaktieren Sie uns:

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We hope to be of assistance to you with this information. If there are any further questions, please do not hesitate to contact us anytime.

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9.5 Installation of motor that turns rotor and sensor for rotation

Installation of rotor motor and sensor for control of rotation in DVC module after assembly of divided rotor

Fig. 1



Fig.2



Fig. 2

By delivery of a DVC module with divided rotor, the motor is installed before delivery to the customer

Fig.3

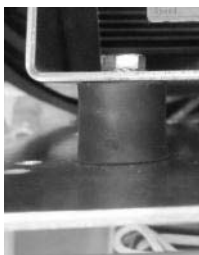


Fig.4



Fig.5



Fig. 3, 4 and 5

The motor and console is secured to the motor plate by 4 shock absorbers mounted by M8 bolts.

Fig.6



Fig. 2 og 6

The drive belt must be placed around the rotor and in the center position of the rotor. Observe brackets for assembly of the rotor segments.

Fig. 7 and 8

• Sensor for control of rotation must be installed by the installer. The distance must be 1-4 mm from the outmost brackets used for the assembly of the rotor segments.



Fig.8

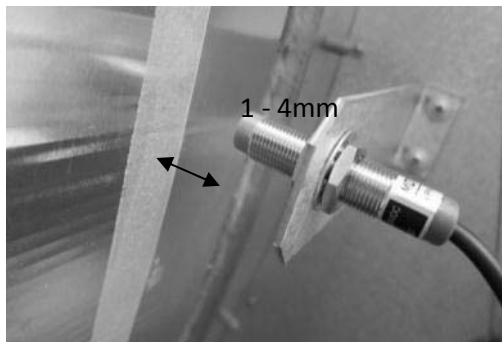
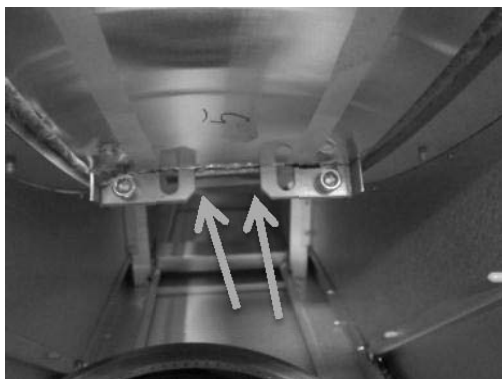


Fig.9

Fig. 9

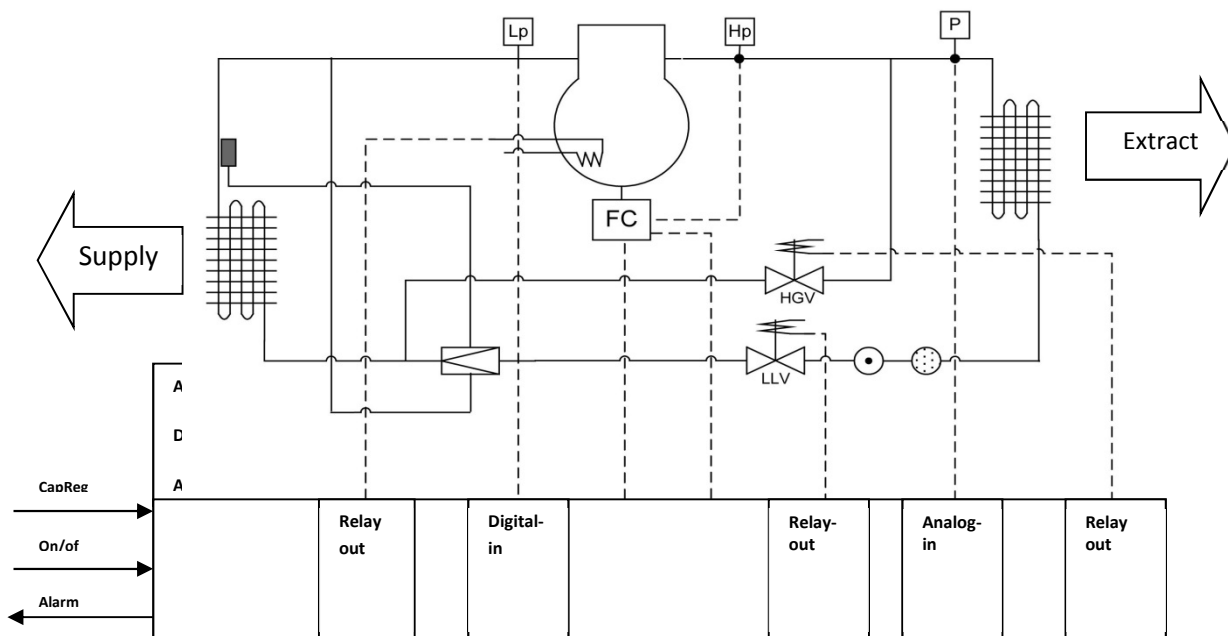
Please be aware of the height of the brackets that are used for the assembly of the rotor segments. Please turn the rotor to check the sensor do not touch any of the brackets.



Annex 10. Internal controller in the cooling compressor units

10.1 DVU – section (cooling unit)

The air handling unit section – DVU – is a separate section in the air handling unit, and the section contains a complete stand-alone cooling compressor system. The system has been started, adjusted and optimized before the delivery. The refrigerant is evaporated directly in the cooling coil and the cooling capacity is regulated automatically and steplessly between 10 and 100 %. The system is delivered with the HFC refrigerant R-407C in the circuit. Internally in the section a DVU-internal controller - LMC251 - and complete control system take care of all safety functions as well as the frequency converter regulated compressor that creates exactly the cooling capacity ordered by the main air handling unit controller via the very common 0-10V DC signal. When the demand for cooling occurs in the room, the main air handling unit controller sends a start signal and a signal exceeding 0 volt to the cooling compressor system. When the signal exceeds 1.5 volt the cooling compressor starts. After start-up the capacity is regulated between 10 and 35 % by the hotgas valve (HGV in the illustration below) in on/off in sequences with the cooling compressor at the lowest number of revolutions. When more than 35 % of the cooling capacity is demanded (signal exceeds more than 3,5 volt) the hotgas valve closes, the cooling capacity is regulated by the frequency converter (FC in the illustration below) to the strictly necessary revolutions of the compressor. By declining demand with the compressor at the lowest revolutions, the hotgas valve is regulated on/off in sequences, when the demand is less than 34 %. The cooling compressor stops when the demand is less than 10 %. To avoid that the compressor stops because the high pressure switch (Hp in the illustration below) cuts off, an automatic capacity reduction system is installed. The capacity reduction system consists of a pressure transducer (P in the illustration below) installed in the high pressure pipe between the compressor and the condenser and software in the DVU-internal controller that reduces the revolutions of the compressor to avoid that the pressure after the compressor develops to the cut-off pressure of the high pressure switch – the system does not stop; it will always remain cooling to some extent. Air volume capacities for supply fan and for exhaust fan are not regulated by the built-in controller – LMC251 - for the cooling system, but by the main air handling unit controller. **The technician from a certified installer of cooling units** must agree with the installer of the ventilation system and the main air handling unit controller that the air volumes for the system are not going to exceed the maximum or to be lower than the recommended minimum mentioned below in section 3.2.5.18 in this manual



10.2 DVU-internal controller for the cooling compressor system

Two LEDs (light diodes) are placed on the DVU-internal controller and each of the LEDs can be on or flash green, red or orange. During normal conditions a permanent green light indicates that everything is normal, orange indicates alternative running mode while red indicates alarm.

LED	Off	Green flashing	Green	Orange flashing	Orange	Red flashing	Red
Upper LED	Off-signal from main AHU controller	..	On-signal from main AHU controller	..	..	..	..
Lower LED	..	..	Compressor active	..	Hotgas active	Alarm	..

Priorities of the collars are:

1. Red (highest priority)
2. Red Flashing
3. Orange
4. Orange Flashing
5. Green
6. Green Flashing (Lowest priority).

10.3 Background illumination of the display

Background illumination of the display switches on automatically when the potentiometer is turned or pressed. The illumination switches off one minute after the last activation of the potentiometer. By alarm the illumination flashes until the alarm is acknowledged

10.4 Potentiometer on the internal controller for the cooling compressor system

The potentiometer is the only tool for the selection of menus and for changing parameters in the DVU-internal controller. The potentiometer is at the right side of the display.

The potentiometer has 3 functions:

1. Turn clockwise : Go to the next menu item or increase parameter value
2. Turn anticlockwise : Go to the previous menu item or decrease parameter value
3. Press : Select menu, start change of parameter or acknowledge and store new value

10.5 Selection of menu

Turn the knob to change menu. When an arrow is shown to the right at the bottom of the display, the menu has a submenu. The submenu is activated by pressing the knob once. If the knob is turned in the submenu you will scroll between the items in the submenu.

Leave the submenu by turning the potentiometer clockwise or anticlockwise until the "menu up" is shown. Press to leave the submenu.

10.6 Change parameters

Turn the knob until the required parameter is shown in the display. Press the knob and turn until the required value is shown. Press the button once more to acknowledge and store the value.

Flashing parameter value in the display indicates that changes are being made and not yet acknowledged and stored.

10.7 Menu – drawing of the menu to guide the user

Drawing of the menu appears from section 12

10.8 The start display

The start picture shown when the potentiometer has not been activated for 10 minutes

- In: nnn% shows the capacity ordered by the main air handling unit controller.
- Out: nnn% shows the capacity ordered by this internal controller - LMC251 – of the compressor.

10.9 Settings

About basic settings in the submenus in the LMC251

10.10 Automatic resets of the high pressure switch

This is about the maximum number of automatic resets of the high pressure switch that are acceptable within one hour. If this number is exceeded, the unit will be shut down until the high pressure switch has been reset manually.

10.11 Polarity

The Alarm polarity can be set to "Normally Open" or "Normally Closed".

10.12 Hotgas – setting of period

This is the number of seconds that the hotgas valve is open. The period is relatively long, but the supply temperature is not oscillating at all and the stability of the supply temperature is sufficient. The number of seconds is a factory setting that should not be reduced. Reduction of the number of seconds will not improve the stability of the temperature to a degree that can be proven by measurements. If the number of seconds is reduced, the number of times that the valve is opened and closed will be increased – maybe considerably, and the valve could be worn out prematurely.

10.13 Limiter

DeltaMax is the maximum acceptable change in % / second of the actual cooling capacity.

10.14 Service

In this menu information about the software version in the controller as well as 2 submenus – "Manual operation" and "Runtime"

10.15 Manual operation

When the menu – Manual operation - is activated, the technician is able to control the operation manually, when the start signal from the main air handling unit controller is on (start signal is just potential free connection of the two terminals – 3&4). This procedure is relevant for the test during the annual maintenance with the control of all safety and regulation procedures or after installation of new components.

If no new settings have been carried out on the controller for 10 minutes, the menu – Manual operation – is deactivated, and the unit returns to the automatic mode.

10.16 Running hours and hotgas activations

In this menu the number of running hours for the compressor, and the number of activations of the hotgas valve can be read. This information is valuable for the maintenance.

10.17 Alarm

10.17.1 Alarm

Show the actual alarm with alarm number.

10.17.2 Alarm Log

The last 15 alarms are logged and it is not possible to delete them. No time-stamps on the stored alarms.

10.18 Modified software in Danfoss frequency converter for the compressor

The standard settings in the Danfoss frequency converter have been changed in 2 menu items, because the safety functions in these menus are transferred to the DVU-internal controller - LMC251;

- In the menu item 5-10 Terminal 18, digital input (start), the value must be changed from 8 to 0.
- In the menu item 5-12 Terminal 27, digital input (free running inverted), the value must be changed from 2 to 0.

Especially for compressor VTZ 121 in DVU 25 and DVU 30 as well as for the compressor VTZ 086 in DVU 20

In addition to the above-mentioned modifications, the modifications below are necessary for the compressor VTZ 121 in DVU 25 and DVU 30;

- Value in menu item 1-90 changed to 2
- Value in menu item 1-93 Terminal 54 changed to 2

Usually the Danfoss frequency converter keeps the change to the standard factory setting stored for ever, but if the software has been turned back to the original factory setting for some reason, the above-mentioned modifications must be carried. If the modifications are not carried out correctly, the compressor will not be switched on at all.

10.19 Maintenance

General maintenance must be carried out according to national and local regulations by a skilled technician from a certified company.

List of spare parts as well as datasheets from the manufacturers are available on the CD delivered with the unit.

Air volume, cooling capacity, refrigerant content

	DVU-10	DVU-15	DVU-20	DVU-25	DVU-30	DVU-40
Width in mm	970	1120	1270	1420	1570	1720
Height in mm	970	1120	1270	1420	1570	1720
Length in mm	970	1120	1120	1270	1270	1270
Weight in kg	190	240	280	375	400	475
Power supply – 3phase + N+ PE	3x400V+ N + PE, 10A	3x400V + N + PE, 16A	3x400V + N + PE, 20A	3x400V + N + PE, 25A	3x400V +N + PE, 25A	3x400V + N +PE, 32A
Nominal air volume, m ³ /s	0.8	1.11	1.65	2.33	2.65	3.33
Minimum air volume, m ³ /s	0.3	0.4	0.5	0.6	0.9	1.0
Test pressure, bar	28.6	28.6	28.6	28.6	28.6	28.6
Refrigerant	R407C	R407C	R407C	R407C	R407C	R407C
Refrigerant content in kg	3	3	4.5	6	6	9.8
Cooling capacity at nominal air volume when: Outdoor 28°C/50% r. H. Room 25°C/50% r. H. Supply air 18°C/90% r. H.	11.1 kW	15.7 kW	23.3 kW	33.8 kW	36.7 kW	47.3 kW

Nominal air volume = highest air volume, where outdoor air is 28 °C/50% r.H. and is chilled by 10 °C.

10.20 Cooling capacity and absorbed power consumption in kW for compressor - EER factor

Cooling capacity and absorbed power consumption data is listed in the table below for calculation of the energy performance of the building. Cooling capacity and absorbed power consumption are listed for 3 levels – minimum – medium – and maximum revolutions for the cooling compressor when the evaporation temperature is 10 °C and condensation temperature is 50 °C. Maximum cooling capacity at nominal air flow when supply air flow is equal to exhaust air flow, outdoor 28 °C/50% r.H., indoor 25 °C/50% r.H. and supply air 18 °C/90% r.H..

Cooling capacity in kW/absorbed power consumption in kW and EER-value – all at nominal air volume

	DVU-10	DVU-15	DVU-20	DVU-25	DVU-30	DVU-40
Minimum – 35 Hz	5.6/1.2 - 4.5	7.7/1.9 - 4.1	11.5/2.2 - 5.2	15.7/3.3 - 4.7	18.5/3.8 - 4.9	23.2/4.5 - 5.1
Medium – 60 Hz	8.9/2.3 - 3.8	12.4/3.4 - 3.7	18.5/4.3 - 4.4	27.5/7.1 - 3.9	29.6/7.1 - 4.2	39.7/9.4 - 4.2
Maximum – 90 Hz	11.1/3.7 - 3.0	15.7/5.4 - 2.9	23.3/6.9 - 3.4	33.8/11.1 - 3.0*	36.7/11.3 - 3.2*	47.3/13.2 - 3.6

*85 Hz

The minimum capacity is selected at the frequency converter output at 35 Hz (the compressor in the DVU 20, 25/30 and 40 can reduce the capacity further to even lower revolutions at 30 Hz). At the lowest revolutions the hotgas valve opens to reduce the capacity further – the lowest cooling capacity equals 10 % of the capacity at 90 Hz. If the temperature and humidity conditions on the site deviate from the above-mentioned conditions, accurate values can be calculated in the design programme SystemairCAD.

Systemair is ready to provide you with a print-out, if a copy of calculation of the specific unit in the SystemairCAD is not available.

10.21 Power consumption for the fans

The unit section - DVU - is one of several sections in the air handling unit, and the supply air fan for the evaporator as well as the exhaust air fan for the condenser, heat recovery and heating coil are installed in other sections. The energy performance for the complete unit including the consumption of the fans is always calculated in the design programme SystemairCAD. Systemair is ready to provide you with a print-out, if a copy of the calculation of the specific unit in the SystemairCAD is not available.

10.22 Data plate

The data plate for the cooling unit is mounted inside the unit section – DVU – behind one of the doors. **An example** of the data plate is shown below.

DVU-40

Manufacturing year	
Serial Number:	
Refrigerant	407C
Quantity of refrigerant	9.8 kg
Compressor	Danfoss VTZ171
Supply voltage	3*400 V + N + PE
Running load ampere	31.5 A
Main circuit breaker	35 A
Short circuit level min	1,0 kA
Short circuit level max	7,3 kA
Max working temperature	55°C
Min working temperature	-40°C
Max working pressure	26 bar
Testing pressure	28.6 bar

10.23 DVU-C – section - cooling unit with cooling recovery

The DVU-C unit is similar the DVU unit but with the difference that condenser on the DVU-C unit is placed in the extract air flow after the rotary heat exchanger with the advantage that the outdoor air is precooled by the rotary heat exchanger, when the extract air temperature is lower as the outdoor air temperature. Due to the reduced outdoor air temperature before the cooling coil, the electricity consumption of the cooling compressor is reduced.

DVU-C sektionen ligner DVU sektionen med den markante forskel at kondensator batteriet på DVU-C sektionen er placeret i luftstrømmen efter den roterende veksler med den fordel, at indsuget udeluft bliver afkølet via den roterende veksler, når temperaturen på fraluften er lavere end temperaturen på den indsugede udeluft. Når temperatur på det indsugede luft er sænket nogle grader før fordampere batteriet, skal kølekompressoren yde mindre, så kølekompressorens elforbrug reduceres.

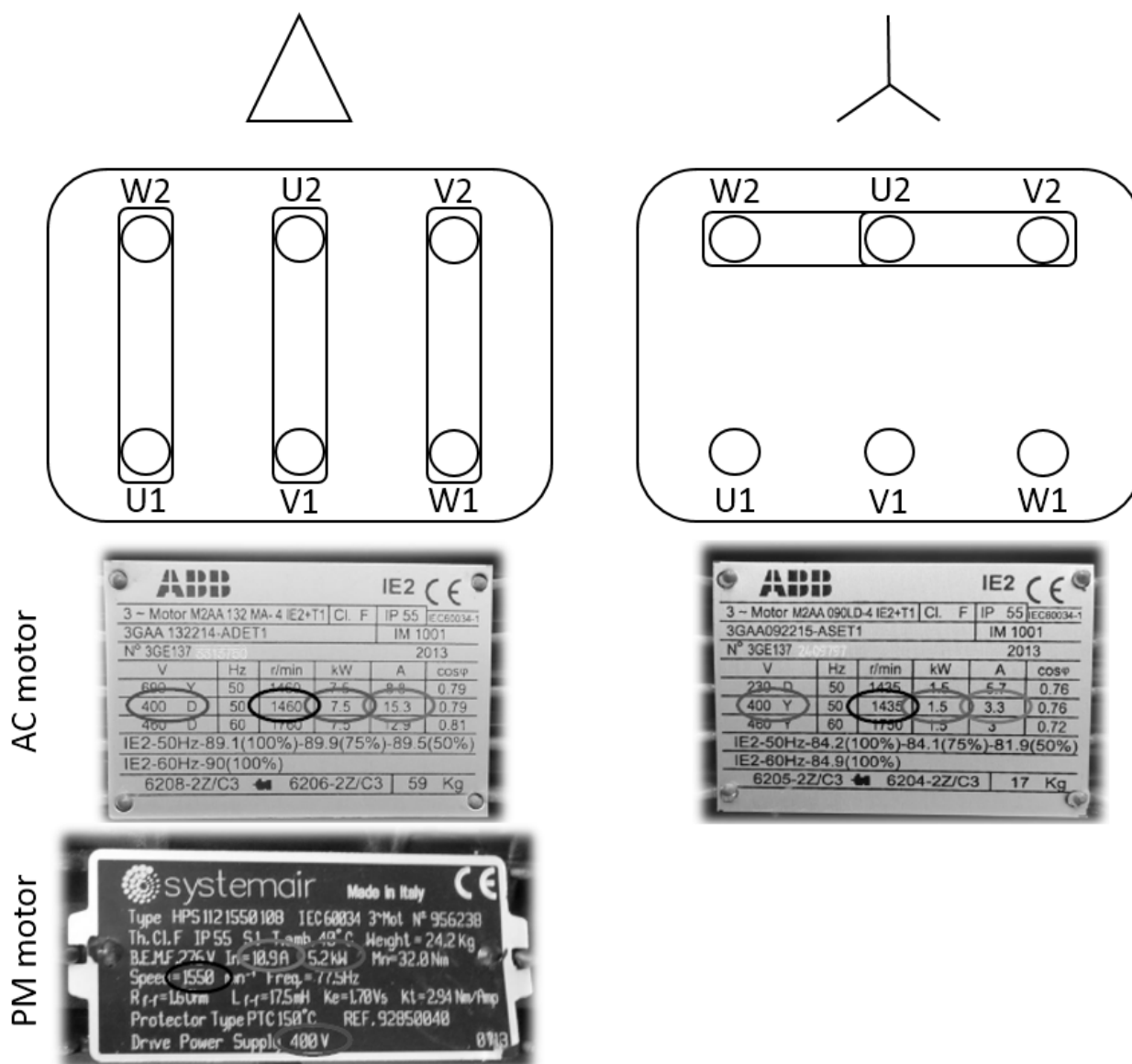
Annex 11. Menu for internal controller in cooling compressor

Menupoint	Submenu	Submenu	Min	Default	Max	Comments
In: nnn%			0	###	100	Set point for capacity level
Out: nnn%			0	###	100	Actual capacity level
SETTINGS						
	MENU UP					
	AUTORES.					
	3		0	3	3	Number of automatic resets of high pressure switch off's within one hour before activation of alarm.
	POLARITY					
	NC		NC	NC	NO	Polarity of BMS set to "Normally Open" or "Normally Closed"
	HOTGAS					
		MENU UP				
		HGDuty				
		TIME NNm	10	60	120	
		MENU UP				
	LIMITER					
		MENU UP				
		DeltaMax				
		%/s	0.1	0.5	10	Max increase og cooling capacity in % per sec.
		MENU UP				
	MENU UP					
SERVICE						
	MENU UP					
	LMC 251					
	Ver 1.05					Software Version
	MANUAL					
		MENU UP				
		FC				
		OFF	OFF	OFF	ON	Manuel operation of frequency converter
		HOTGAS				
		OFF	OFF	OFF	ON	Manuel operation of Hot Gas valve
		LIQUID.V				
		OFF	OFF	OFF	ON	Manuel operation of LIQUID valve
		CPR.HEAT				
		OFF	OFF	OFF	ON	Manuel operation of COMPRESSOR HEAT
		CTS				
		OFF	OFF	OFF	ON	Manuel operation of BMS switch
		MENU UP				
	RUNTIME					
		MENU UP				
		COMPRESS				
		nnnnnnnh	0	#####	1E+07	Compressor running time
		HOTGAS				
		nnnnnnn	0	#####	1E+07	Hot Gas valve activation
		MENU UP				
	MENU UP					
Alarm						
	MENU UP					
	ALARM ##					
	Alarm					Alarm name and number
	AlarmLog					
		MENU UP				
		AL 1: ##				
		Alarm				List over the last 15 alarms
		AL 2: ##				
		Alarm				
		MENU UP				
	MENU UP					
MENU UP						

Annex 12. Connection of fan motor and set-up for frekv. conv.

12.1 Connection of fan motor

Delta connection – for low speed – is shown to the left, and star connection – for high speed – is shown to the right.



12.2 Set-up for Danfoss FC101 for DV-units with AC motors

SETUP IS DONE IN FACTORY BEFORE DELIVERY

To reload Systemair factory settings from the control panel:

0-50: LCP Copy: [2]

Systemair factory set-up is based on Danfoss initialization.

14-22: Operation mode: [2] Initialisation (Danfoss Initialisation)
Turn power off and on.

Systemair factory set-up:

0-01: Language selection:

1-03: Torque characteristic: Single fan: [3] Auto-Energy optim.
With twin fan set-up: [1] Variable Torque

1-20: Motor Power: According to motor plate / order papers
With twin fan set-up total power must be used

1-24: Motor Current: According to motor plate / order papers
With twin fan set-up total current must be used

1-25: Motor Nominal Speed: According to motor plate / order papers

1-42: Motor Cable Length: 3m

1-50: Motor Magnetisation at zero speed.: 0 %

1-52: Min. Speed Normal Magnetisation: 10 Hz

1-73: Flying Start: [0] Disabled

1-90: Motor Thermal Protection: [2] Thermistor trip

3-15: Reference 1 Source: [2] Analog input AI54

1-93: Thermistor Source: [1] Analog input AI53

3-03: Maximum Reference: Max. Hz from order papers

3-16 + 3-17: Reference 2- and 3 Source: [0] No function

3-41 + 3-42: Ramp 1 up and down: 20 Sec.

4-19: Max. Output Frequency: 90Hz

4-14: Motor Speed High Limit: 90Hz

4-18: Current limit: 100 %

5-12: Terminal 27 Digital input: [0] No operation

5-40.0: Function Relay: [3] Drive ready/remote

5-40.1: Function Relay: [3] Drive ready/remote

6-25: Terminal 54 High Reference: Max. Hz from order papers

14-03: Over modulation: [1] Active

14-20: Reset Mode: [2] Automatic reset x 2

0-50: LCP Copy: [1] All to LCP (Copy of Systemair factory settings to panel)

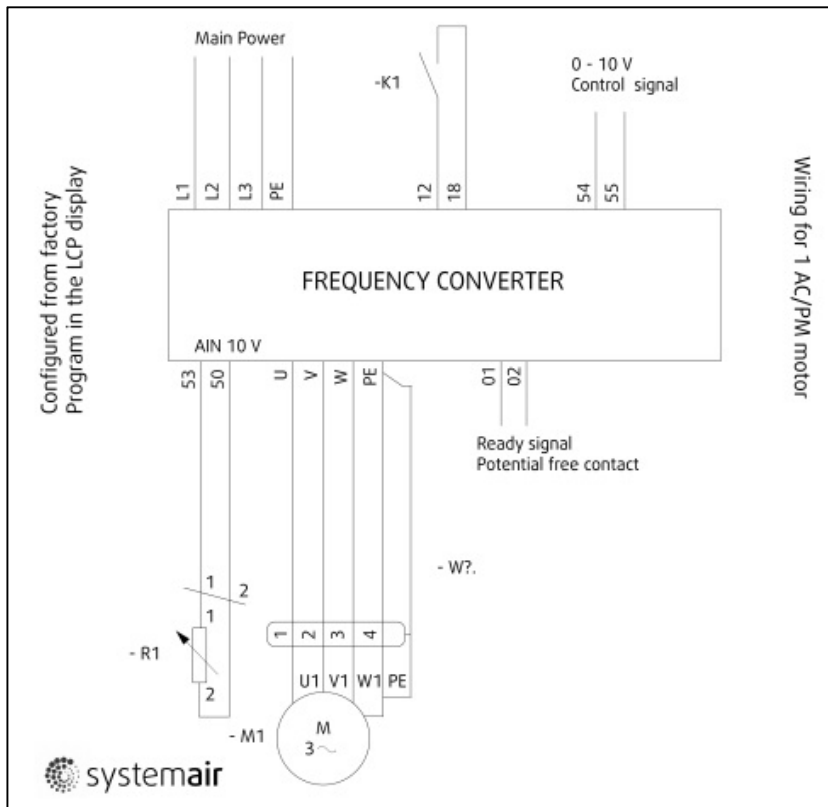
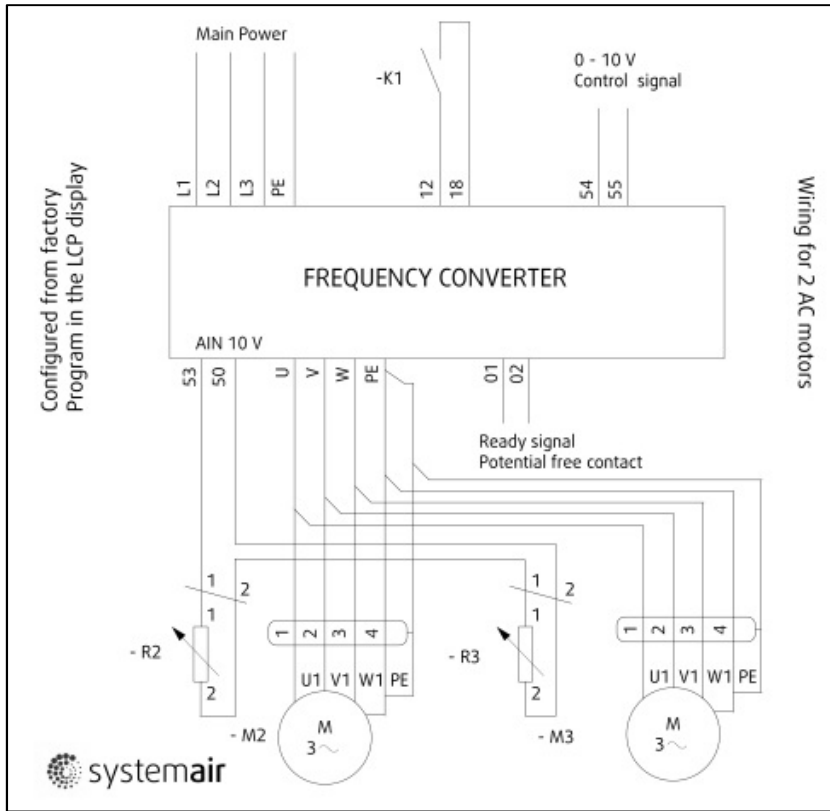
Connections:

0-10V: terminal 54-55

Start: terminal 12-18

Thermistor: terminal 50-53

Drive ready: terminal 1-2



12.3 AC-fan operation without thermistor for Danfoss FC101.

Systemair factory set-up is based on Danfoss initialization.

14-22: **Operation mode:** [2] Initialisation (Danfoss Initialisation)
Turn power off and on.

Systemair factory set-up:

0-01: Language selection:
1-03: **Torque characteristic:** [3] Auto-Energy optim.
1-20: **Motor power:** According to motor plate
1-24: **Motor Current:** According to motor plate
1-25: **Motor Nominal Speed:** According to motor plate
1-29: **Automatic motor adaption (AMA):** [1] Kompl.motor adaption to (Turn power off and on.)
1-42: **Motor Cable Length:** Order specific
1-50: **Motor Magnetisation at zero speed.:** 0 %
1-52: **Min. Speed Normal Magnetisation:** 10 Hz
1-73: **Flying start:** [0] Deactivated
5-40.0: **Function Relay:** [3] Drive ready/remote
14-03: **Over modulation:** [1] Active
14-20: **Reset Mode:** [2] Automatic reset x 2
0-50: **LCP Copy:** [1] All to LCP (Copy of Systemair factory settings to panel)

Connections:

0-10V: terminal 54-55

Start: terminal 12-18

Drive ready: terminal 1-2

Jumper terminal 12-27

12.4 Set-up Danfoss FC101 for DV-units with PM motors

SETUP IS DONE IN FACTORY BEFORE DELIVERY

To reload Systemair factory settings from the control panel:

0-50: LCP Copy: [2]

Systemair factory set-up is based on Danfoss initialization.

14-22: Operation mode: [2] Initialisation (Danfoss Initialisation)
Turn power off and on.

Systemair factory set-up:

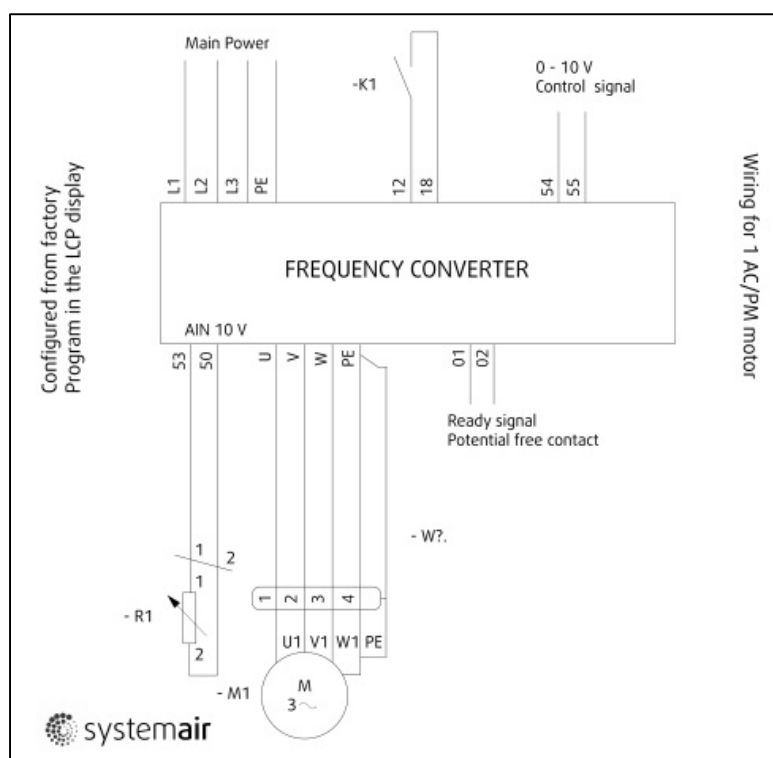
0-01: Language selection:
1-06: Clockwise Direction: [1] Inverse
1-10: Motor Construction: [1] PM, non-salient SPM
1-24: Motor Current: According to motor plate / Schedule
1-25: Motor Nominal Speed: According to motor plate / Schedule
1-26: Motor Cont. Rated torque: According to motor plate / Schedule
1-30: Stator Resistance (Rs): According to motor plate / Schedule
1-37: d-axis inductance (Ld): According to motor plate / Schedule
1-39: Motor Poles: According to motor plate / Schedule
1-40: Back EMF at 1000 RPM: According to motor plate / Schedule
1-42: Motor Cable Length: 3m
1-90: Motor Thermal Protection: [2] Thermistor trip
3-15: Reference 1 Source: [2] Analog input AI54
1-93: Thermistor Source: [1] Analog input AI53
3-03: Maximum Reference: According to motor plate / Schedule
3-16 + 3-17: Reference 2- and 3 Source: [0] No function
3-41 + 3-42: Ramp 1 Up and down: 30 sec.
4-19: Max. Output Frequency: According to motor plate / Schedule
4-14: Motor Speed High Limit: According to motor plate / Schedule
4-18: Current limit: 115 %
5-12: Terminal 27 Digital input: [0] No operation
5-40.0: Function Relay: [3] Drive ready/remote
5-40.1: Function Relay: [3] Drive ready/remote
6-25: Terminal 54 High Reference: According to motor plate / Schedule
14-03: Over modulation: [1] Active
14-20: Reset Mode: [2] Automatic reset x 2
0-50: LCP Copy: [1] All to LCP (Copy of Systemair factory settings to panel)

Connections:

0-10V: terminal 54-55
Start: terminal 12-18
Thermistor: terminal 50-53
Drive ready: terminal 1-2

Schedule for PM motor parameters

Menu:	124	125	126	130	137	139	140	303 + 625	414 + 419
Motor Type Number	Amp Name plate	Motor RPM rated	Nm Name plate	Ohm [Rf-f]	mH [Lf-f]	Poles	Bemf @ 1000	Max Hz	Max motor Hz
HPS 71 3800 18	1,8	3800	2	3,600	13,00	6	67	215	219
HPS 71 3700 28	2,8	3700	3,6	1,580	6,10	6	79	191	204
HPS 71 3300 18	1,8	3300	2,6	5,750	20,50	6	85	170	182
HPS 71 3200 30	3	3200	4,2	1,850	7,25	6	84	161	176
HPS 71 2900 21	2,1	2900	3,3	4,500	14,75	6	95	143	160
HPS 71 2800 40	4	2800	6,14	1,675	6,75	6	95	144	154
HPS 71 2500 29	2,9	2500	5	3,000	11,00	6	105	129	138
HPS 71 2350 38	3,8	2350	7,3	2,300	9,35	6	115	120	129
HPS 90 2650 64	6,4	2650	9,6	1,250	10,75	8	87	182	194
HPS 90 2350 76	7,6	2350	13	0,800	10,00	8	103	159	172
HPS 90 2100 63	6,3	2100	10,5	1,500	14,75	8	101	142	154
HPS 90 2050 100	10	2050	19	0,810	8,75	8	115	140	150
HPS 90 1850 84	8,4	1850	16	1,050	11,50	8	110	127	136
HPS 90 1900 136	13,6	1900	26	0,575	7,25	8	110	127	139
HPS 90 1700 106	11	1700	22	0,575	7,25	8	117	116	125
HPS 112 1550 108	10,9	1550	32	0,750	8,75	6	178	80	85
HPS 112 1700 145	14,5	1700	39	0,465	5,45	6	162	88	94
HPS 112 1350 135	13,5	1350	44	0,490	6,45	6	197	69	74
HPS 112 1500 187	18,7	1500	54	0,295	4,35	6	175	76	83
HPS 112 1000 140	14	1000	51	0,475	7,00	6	242	54	55
HPS 132 1250 199	19,9	1250	69	0,255	7,60	6	210	65	69
HPS 132 1000 202	20,2	1000	77	0,315	9,25	6	230	51	65
HPS 132 1150 300	30	1150	104	0,235	8,00	6	230	58	65
HPS 132 930 273	27,3	930	118	0,280	9,75	6	261	46	65



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